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JOURNAL
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Volume 6 JANUARY, 1931 Number 1

Scholastic Aptitude Tests for Medical Students*

F. A. Moss
George Washington University

I. History and Purpose of the Study

The purpose of our study has been the improvement of our present methods of predicting scholastic success in medicine and of picking out those who would fail in a medical school. Following the report last year[1] of the value of the aptitude tests in predicting medical school success in twenty-two schools, the Association appointed a Committee[2] to direct further experimental study of these tests as a criterion in selecting medical students. This year's investigation included: First, a study of the relation between the test scores and work over two years in the medical school, following through their sophomore year those students on whom we reported last year as freshmen. Second, it included a further study of prediction of scholastic success in the freshman medical work in fifty additional schools that gave the test this year. And, third, it included a comparative study of certain other criteria for selecting medical students.

In every instance, the tests were given by someone in the local medical school and forwarded to our committee for scoring and tabulation. The results were then sent to the dean of the school cooperating so that he might use them in any way he desired in connection with advising or eliminating students. At the end of the year, transcripts of the medical school grades of the students were forwarded to us for use in studying the efficiency of the test in predicting the grades.

II. Colleges Cooperating

The schools that have cooperated to date are divided into three groups. The first group, including fourteen schools, gave tests to their freshman students in the spring of 1929. These students were included in our study of the relation between tests and freshman grades, reported last year. Of these students, those who survived the freshman year have been followed through their second year and their grades for both

*Report of Committee on Scholastic Aptitude Test. Read at Forty-first Annual Meeting of the Association, held in Denver, Oct. 14-16, 1930.

1. J. A. A. M. Colleges, Vol. 5, No. 2, March, 1930, p. 90.
2. The Committee: Torald Sollmann, chairman; Wm. Darrach; H. G. Weiskotten; Ben Wood; F. A. Moss, secretary and director of study.

years correlated with their Aptitude Test scores. The second group of thirteen schools cooperating administered tests to their freshman students at the beginning of school in September, 1929. The third group administered a new form of the test to their freshman class in the spring of 1930 (last April). In addition, certain of the medical schools and several colleges training premedical students gave the test last spring to applicants to medical schools.

It is needless to list the schools cooperating, for to do so would be practically to call the roll of members of this Association. Altogether, 67 medical schools in the United States, one in the Philippines, and two in Canada have cooperated in the study. A total of 7,468 tests have been given; 1,035 to medical students and 517 to premedical students in the school year 1928-1929; and 4,811 to medical students and 1,105 to premedical students in the school year of 1929-1930.

III. How the Test Predicts the First Two Years' Medical Work

How well the test predicted scholastic success over two years' medical school work is shown in Charts 1 and 2.

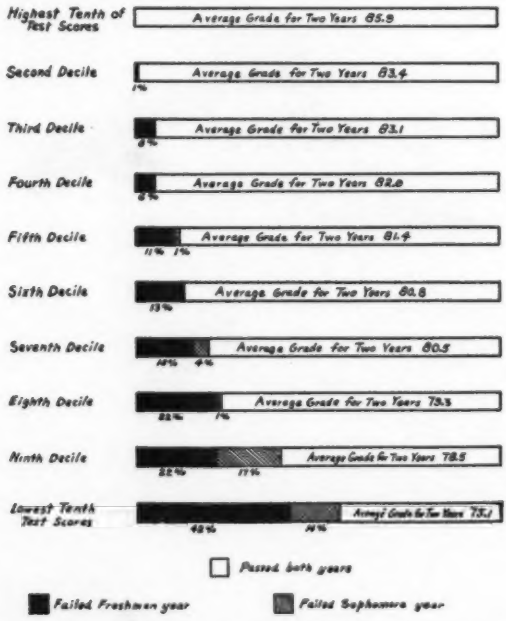

Fig. 1. Success in the first two years of medical school according to tenths of test scores.

In Chart 1 the students were divided into ten equal groups on the basis of their scores on the Scholastic Aptitude Test. Each bar shows the medical school grades over two years for one-tenth of the group. For example, in the highest tenth of test scores, there are no failures[3] in either the freshman or the sophomore year; and the average grade of this group of students for the two years is 85.9. Contrast this with the lowest tenth. We find 42 per cent failing the freshman year, and an additional 14 per cent failing the sophomore year, making a total of 56 per cent who have failed by the end of the second year. The average of all the grades for this lowest group is barely passing, being 75.1. The other lower groups also show large percentages of failures and low average grades for the group. If mortality in the last two years of medical school should be as high as in the first two years, there will be none of these lower groups who will graduate from medical school.

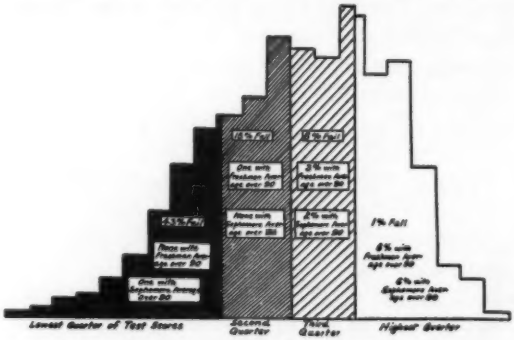

Fig. 2. Percentage of failures and high marks in different test score quarters.

In Chart 2 the students were divided into four groups on the basis of Scholastic Aptitude Test scores. In the highest quarter of test scores, 8 per cent made averages of 90 or over in their freshman year, and 6 per cent made this average in their sophomore year. Only 1 per cent failed, the failures being made in the freshman year. In the third or next to highest quarter, 3 per cent made 90 or over in their freshman year, and 2 per cent in their sophomore year. In this quarter only 8 per cent had failed by the end of the sophomore year. In the second quarter there is only one record with an average above 90, this being in the freshman year. Eighteen per cent of this quarter had failed by the end of the second year's work. In the lowest quarter, 43 per cent

3. In this study, all medical school grades have been reduced to a comparable basis, using 75 as the passing point.

have failed by the end of the sophomore year. There is only one record with a 90 average, that being in the sophomore year. Thus, in the whole group of about 900, only one student in the lower half of test scores has a freshman average as high as 90 and only one with a sophomore average as high as 90; while in this lower half there is a very large percentage of failures and low grades.

Based upon the distribution of two years of medical school grades in the various test score groups, we may state:

If a Student has a Score as High as the Upper Tenth of Those Tested:

The chances are 100 per cent that he will pass at the end of the sophomore year.

And the chances are 68 out of 100 that he will average 85 or over at the end of the sophomore year.

On the Other Hand, If He is as Low as the Lowest Tenth of Those Tested:

The chances are 56 out of 100 that he will fail by the end of the sophomore year;

And the chances are 96 out of 100 that he will average below 85 at the end of the sophomore year;

Or 76 out of 100 that he will average below 80.

If He Has a Score as High as the Upper Quarter:

The chances are 99 out of 100 that he will pass at the end of the sophomore year;

And the chances are 49 out of 100 that he will average 85 or over at the end of the sophomore year.

On the Other Hand, If He Has a Score as Low as the Lower Quarter.

The chances are 43 out of 100 that he will fail by the end of the sophomore year;

And the chances are 93 out of 100 that he will average below 85 at the end of the sophomore year;

Or 62 out of 100 that he will average below 80.

High correlation coefficients were obtained between the test scores of the students and the final grades given by instructors in the medical schools, both in the freshman year and in the sophomore year. The correlation for the group as a whole for first year grades was 0.59 and for second year grades was 0.54. This difference does not necessarily represent a lower predictive value for the test in the second year, but probably a lowering effect on the correlation of having eliminated a large number of the poorer students before the second year. We had

correlations in separate schools of this group as high as 0.72 for the freshman grades and as high as 0.73 for the sophomore grades.

IV. Further Study of Aptitude Tests in Predicting Freshman Grades

The study of test prediction of scholastic success in the freshman year of medical school has consisted of study of the grades made by three groups of freshman students: a group of about 900 who took the test in the spring of 1929 and were freshmen during the year 1928-9; a group of about 1,000 who took the test in the fall of 1929; and a group of about 4,000 who took the test in the spring of 1930, the two last groups being freshmen during the past scholastic year. These groups have been combined and the results are presented in Chart 3. For a detailed discussion of results with the first group, we refer to our report of last year.[4]

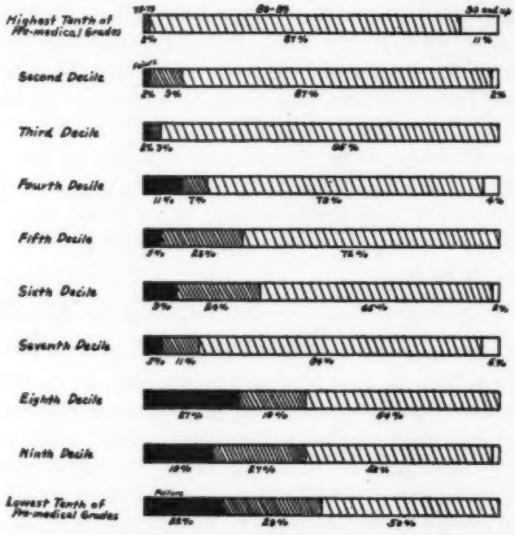

Fig. 3. Distribution of freshman medical grades according to tenths of test scores.

It might be noted that this year's group shows a somewhat larger percentage of 90 grades, due undoubtedly to greater leniency in grading on the part of some of the schools cooperating in this year's group. Also the toal number of failures the groups taking the test in the fall appears larger. This is to be explained by the fact that this group

4. J. A. A. M. Colleges, Vol. 5, No. 2, March, 1930, p. 90.

includes all those who entered at the beginning of the year while the spring groups include only those who survived till the middle of the second semester. Some of the weakest students in these groups had already dropped out when the test was given.

Chart 3 summarizes the prediction of grades in the three freshman groups. As in Chart 1 for the sophomore group, each bar represents one-tenth of the group on the test scores. For each tenth the distribution of medical grades is shown. For example, in the highest tenth of test scores, 15 per cent make 90 or above, 77 per cent between 80 and 89, and 8 per cent between 75 and 79, with no failures. Contrast this with the lower groups of test scores in which there are none above 90, and the percentage above 80 is relatively small, but the number of failures becomes increasingly larger as we go down on the Aptitude scale.

On the whole, the results as shown in the three groups indicate a high predictive value for the test. With few exceptions those in the upper part of the test distribution make very creditable grades, while those in the lower part are very likely to be failure students. The results are further substantiated by high correlation coefficients between test scores and grades in most of the schools added to our study this year. The correlation for this year's freshman group as a whole was 0.55. In one school giving tests this spring we found the exceedingly high correlation coefficient between test scores and freshman work of the students of 0.83.

V. Comparative Study of Other Criteria for Selecting Medical Students

The Committee has been interested in studying the predictive value of certain other criteria which are now generally used in selecting medical students, and comparing with these the predictive value of the test scores. It is, of course, obvious that we should not recommend the replacements of valuable criteria already in use by Aptitude Tests alone; but within the limits of practicability of application it would seem desirable to have all the possible criteria of ability for consideration before admitting students. It is to be expected that an ideal criterion of admission would be a combined rating which would give proper weight to those factors proving most valuable.

The real value of the Aptitude Test is seen in comparison with other methods now commonly used for admitting students to medical schools. Such criteria include: (1) Quality of premedical work, or grades on premedical subjects; (2) personal interviews and personal

ratings, and (3) number of semester hours' credit offered in premedical college work.

(1) GRADES ON PREMEDICAL SUBJECTS.—This is probably the most generally used criterion for admission. In order to study the comparative value of premedical subject grades and the Aptitude Test scores, we requested from a selected number of schools who had cooperated, the premedical records or ratings of their freshman classes. The schools requested were selected with the intention of obtaining representative schools from the various sections of the country. Included in the group that forwarded premedical records were: Stanford and California from the Pacific Coast, North Dakota and Western Reserve from the North Central States, Vermont from New England, George Washington and Howard from the Middle Atlantic, and Alabama and North Carolina from the South. In order to make the records for all the schools comparable we have used the grades in required premedical subjects, including general chemistry, organic chemistry, physics, zoology, and English, average premedical grades being calculated on the basis of these subjects.

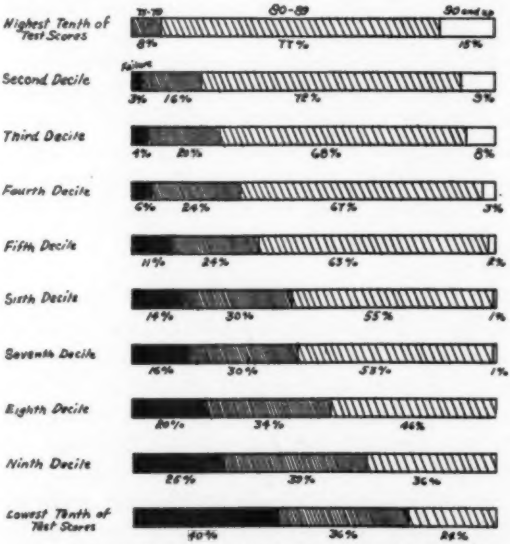

Fig. 4. Distribution of freshman medical grades for different premedical averages.

Chart 4 shows the distribution of freshman medical grades for different premedical averages. In this chart the freshman students are

divided into ten equal groups on the basis of their premedical averages. The first bar represents the highest tenth of students in their premedical work, the second bar the next to the highest tenth, and so on to the last bar which represents the lowest tenth in premedical grades. Noticing those of the highest tenth of premedical grades, we see that 11 per cent of them made an average freshman medical grade between 90 and 100, and 8 per cent made between 75 and 80, none failing the first year; and similarly for those in the other tenths of premedical grades. It can be seen from this chart that there is a definitely positive relation between premedical grades and success in freshman medical work, there being a definite tendency for those with high premedical records to do better medical school work than those with low premedical records. However, this chart should be contrasted with Chart 3 where the students are divided into tenths on the basis of test scores. The highest tenth of premedical grades shows 11 per cent of 90 or above medical grades in the first year; the highest tenth of test scores shows 15 per cent of 90's. The last three tenths of premedical grades show practically no difference in distribution of freshman medical grades; the last three tenths of test scores show a constant gradation in the medical work of the students. A student who falls in the lowest tenth of premedical grades has a 50-50 chance of making a freshman average of 80 or above; if he falls in the lowest tenth of test scores he has only about one chance in four of making a freshman average of 80 or above.

Since our medical schools are more particularly interested in predicting failures in the medical school, we have also approached the comparative study of premedical grades and test scores in a little different way.

In the nine schools for which we had premedical college records of the students, there were 55 among those taking the test who received freshman medical averages below passing (below 75). These students had already been selected largely on a basis of premedical grades. However, for the purpose of comparing the two criteria for selection, let us suppose that entrance standards had been set at "C" or "80" premedical average, and at the lower quartile point on the test, and all had been refused admission who had premedical averages below 80 or who had scores in the lower quarter of the distribution. While these are rather arbitrarily assumed deadlines, they are probably commensurate with any changes that might be made in these requirements. By such a premedical criterion 43 per cent of the failures would have been eliminated. On the other hand, by the test score criterion indicated, 69 per cent would have been eliminated. These percentages are shown by two of the bars as indicated on Chart 9.

It is of further importance to notice the number of good students that would also be eliminated; for a criterion could not be called efficient, even if it eliminated failures, if at the same time it also eliminated a number of good students. In the nine schools there were 125 freshman medical averages of 85 or above. The indicated premedical criterion would have eliminated eight making averages as high as 85, the Aptitude Test criterion only one.

Considering both criteria together, we find that 73 per cent of the failures occurring in this group could have been eliminated by a combination criterion. (See Chart 9.) Thus we might say—with selection based largely on premedical grades and with the present standards, there are 55 failures in these nine schools. Forty-three per cent of these could have been eliminated with a premedical criterion raised to "80" average, but eight of the students with averages of 85 or above would also have been eliminated. Sixty-nine per cent of them could have been eliminated with a test criterion (refusing admittance to the lowest quarter of scores) with only one 85 student eliminated.

It would seem from these comparisons that the test scores would

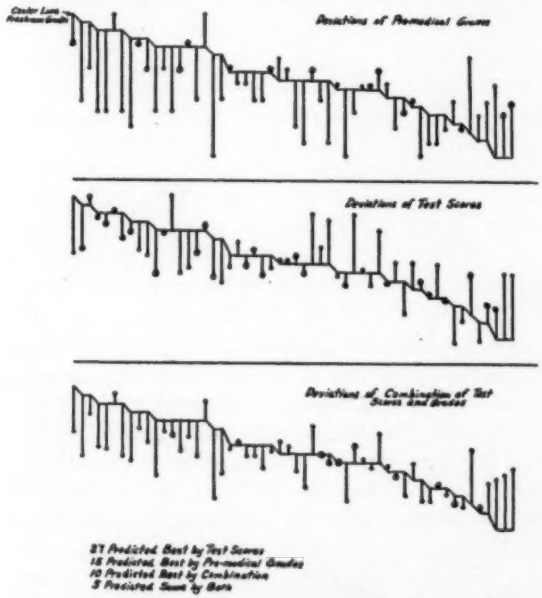
Deviations of Premedical Grades
Deviations of Test Scores
Deviations of Combination of Test Scores and Grades
27 Predicted Best by Test Scores
18 Predicted Best by Premedical Grades
10 Predicted Best by Combination
3 Predicted Same by Both

Fig. 5. Prediction of freshman medical grades in school A by various criteria.

predict somewhat better than the premedical grades the degree of success in the medical school, but we should desire to give consideration to the value of each in a composite criterion of selection.

For each of the nine schools a detailed study has been made of the agreement of the premedical grades, test scores, and a combination of the two with freshman medical grades. Two of these detailed studies are shown graphically in Charts 5 and 6.

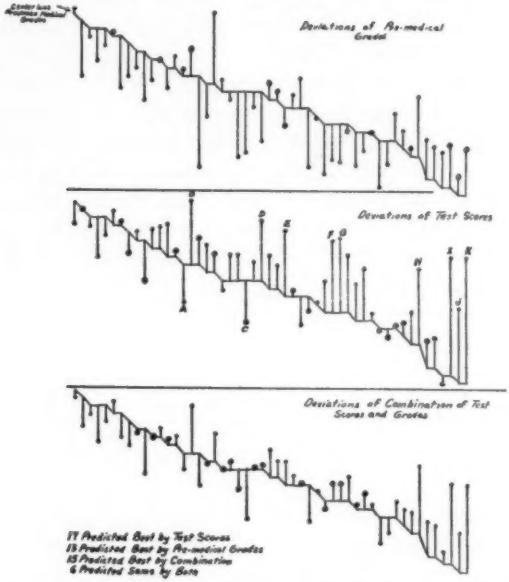
Deviations of Pre-medical Grades
Deviations of Test Scores
Deviations of Combination of Test Scores and Grades
17 Predicted Best by Test Scores
13 Predicted Best by Pre-medical Grades
15 Predicted Best by Combination
6 Predicted Same by Both

Fig. 6. Prediction of freshman medical grades in school B by various criteria.

In each instance the medical school grades of the students for the freshman year have been plotted along the irregular descending line across the chart from left to right. The upper plot on each chart shows the premedical grades plotted against freshman medical work. Where the dot occurs near the line of medical grades it means that the premedical grades predicted well the freshman medical work. The distance of the dot above or below the line shows the extent to which the premedical grade failed to predict the freshman work in the medical school.

The second plot shows on a comparable scale the extent to which the Aptitude Test scores predicted the freshman medical grades. The

third plot shows the prediction by using a combination of premedical grades and test scores, giving each an equal weight. The students occupy the same relative order in the three plots, so that each student's record for the test and the combination is presented directly under his representation on the top plot. The circles around the dots indicate "best predictions." For example, if a student's work in the freshman year is predicted best by the test score, this dot for him in the test plot is encircled.

In School A, Chart 5, we find 27 whose freshman medical work is predicted best by the test score, 15 predicted best by the premedical grade, and 10 best by the combination, and 5 predicted the same by the two criteria. Or we may say that by use of the test or a combination of the test and the premedical grades, the prediction of the freshman medical work can be improved in 37 cases or in 68 per cent of the group. It is interesting to note that prediction by the premedical grades is poorest for those making distinctly high records in the medical school and those making distinctly low records. In the majority of the cases the premedical grades predict too low for the high medical school records and too high for the failure records in the medical school.

To examine in more detail the records for School B, Chart 6, we may note the following:

Thirteen are predicted better by the premedical grades than by either the Aptitude Test or the combination. As will be seen from the chart there are a number of marked discrepancies in the top plot. In most instances these are students with low or mediocre premedical records who have done good work in the medical school. And if these are checked in the second plot of Aptitude Test records it will be seen that their ability rating on the test usually places them much closer to their actual achievement in the medical school.

Noticing now more particularly the second plot of this chart, we find 17 predicted better by the Aptitude Test than by either the premedical grades or the combination. By use of the test either alone or in combination with premedical grades, prediction could have been improved in 63 per cent of the cases. In this plot also there are several discrepant cases. We have marked cases "A" to "K" for special consideration.

In the case of "A" who did better work in the medical school than his Aptitude score would indicate (and who also did better premedical work), a note from the admissions officer of his school says "he is a student who works with great enthusiasm when interested." Here we probably have a case of compensation for certain lack of ability by other

traits conducive to success. The test may indicate his ability but of course, cannot indicate interest and enthusiasm out of proportion to that of other students.

Student "C" according to admission officers of his medical school is a Japanese and one who "has shown marked ability in investigation in bacteriology before entering the medical school. He is rather slow but thorough." Here we have a student in medical school with performance above both his test record and his premedical record. Foreign parentage and a language difficulty probably lowered his test record and previous experience and interest raised his medical school work. Student "D," who made a first year record considerably below her ability, was reported to us as follows: "D" took the medical work in biochemistry during summer quarter preceding entering the medical school, at the end of a hard year, and made grades that materially affected her first year record."

Student "H" was reported as having "good ability but lazy and conceited." His ability is borne out by his relative position on the test, and his laziness by his low record in his medical work.

Case "I," another student whose ability is according to the test much above his performance, is reported as a "reformed druggist, one with a background which for some reason rarely seems to be conducive to good work in the medical school."

About case "K" the admission officer states that he "is a very kind-hearted, easy-going fellow of especially attractive personality, who is easily induced to do something else than his work. For instance, he put in hours and hours reading to a blind fellow student in another department, reading his lessons to him, rather than doing his own work."

Students B, E, F, G, and J, it will be noticed, show abilities on the test above their performance in the first year medicine. No explanation has been indicated for these. Taking for granted that they could not have obtained a test record higher than their actual ability, we must assume that they are working at a very low efficiency, at a level much below their capabilities.

These individual cases are cited to indicate that Aptitude Test results cannot measure extraneous factors of interest, study habits, outside worries, etc. Inasmuch as these factors cannot be measured, no criteria will give a perfect prediction of scholastic success in the medical school. However, a knowledge of the ability as shown by test results is often of considerable value in dealing with such problem cases.

Similar results were obtained upon individual analysis of the records of the other schools in this group.

(2) Interview Ratings on Personality Traits.—Interviews should be given consideration among the criteria for selecting students because of the possibility of gaining through their use knowledge of traits of personality or character which might mitigate against the success of a student. While it is highly desirable to consider such traits, interviews are often so unreliable as to make us hesitate to give much weight to ratings based upon such interviews. There seem to be three chief reasons for the unreliability of the interview. First, those conducting the interview tend to generalize on too few experiences. If the interviewer has had an unfortunate experience with one red-headed person, he tends to regard all red-headed people with suspicion. A second cause for the unreliability of the interview is the widespread assumption that habits are general rather than specific. It is assumed that

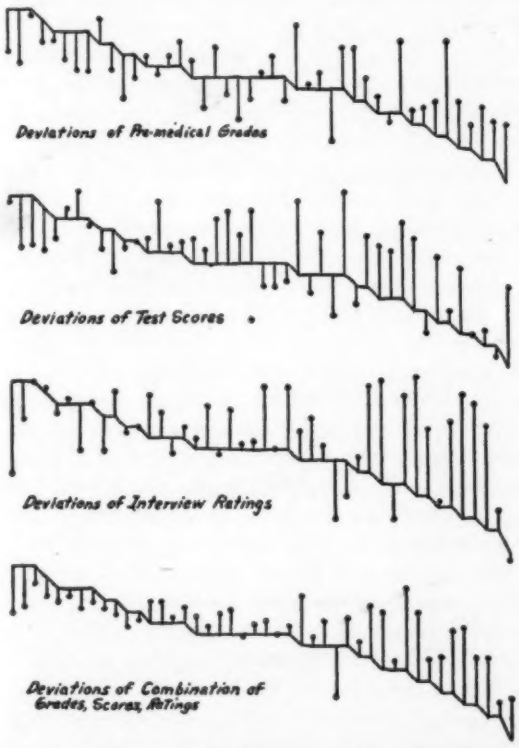
Deviations of Pre-medical Grades
Deviations of Test Scores
Deviations of Interview Ratings
Deviations of Combination of Grades, Scores, Ratings

Fig. 7. Prediction of freshman medical grades in school C by various criteria.

neatness in one situation will carry over into other situations or it may be assumed that a person who talks rapidly will also work rapidly. And the third and probably most important reason for the unreliability of the interview is the total lack of standards for judging answers to the interviewer's questions. When we estimate the patient's hemoglobin by the hemoglobinometer our results are fairly reliable because we make direct comparison with a standard. But unfortunately no such standards are available for estimating one's showing in an interview.

In two of the nine schools already discussed, ratings given on personal interviews with the students were available. These ratings were made by committees of medical school officers and instructors before admission of the students. In one of the schools ratings were given on a 0 to 4 scale, and in the other on a 0 to 3 scale.

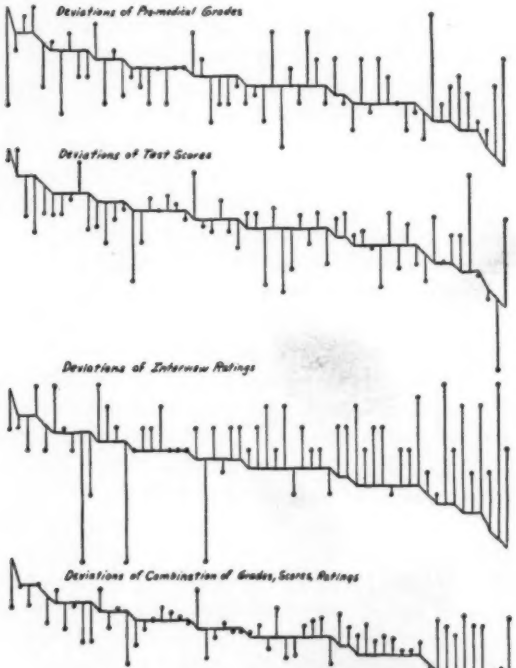
Deviations of Pre-medical Grades
Deviations of Test Scores
Deviations of Interview Ratings
Deviations of Combination of Grades, Scores, Ratings

Fig. 8. Prediction of freshman medical grades in school D by various criteria.

The comparative efficiency of premedical grades, test scores, and ratings are shown in Charts 7 and 8. An examination of the rating plots for these two schools will show that there are a number of very wide discrepancies. In school "C" one of the men with a freshman medical school average of 89, the highest in the group, was given one of the lowest interview ratings. Of the twelve students in this school making a freshman average below 80, eight of them were given high interview ratings.

And in School "D," we find three personal ratings of zero. All three of these men made above 80 in their freshman medical work, making averages of 83, 85, and 86 respectively. There are in the group also five men with rating of 3 (highest). Two of these five make freshman averages below 80.

In order to compare the prediction of failures by interview ratings with the prediction of failures by the other criteria, we drew the "deadline" at the lowest quartile point of the total group of ratings. There are in the two schools nine failures. If we refused admission to those in the lowest quarter of ratings, we would eliminate three of these nine failures, at the same time eliminating 6 out of 26 who make 85 or above. By a combination of the three criteria (premedical grades, test, and rating) six of the failures would have been eliminated.

While no very definite conclusions could be drawn from a study of only two schools, the results in these instances indicate very little predictive value for interview ratings. In fact, slightly better prediction of failures seems to be obtained by a use of a combination of only premedical grades and test scores, or by use of test scores alone, than by a criterion giving weight to interview ratings. It is probable that we should want to retain interview methods for special cases, but it may be that better prediction can be secured without giving such ratings a definite weight in determining admission. More study along this line is necessary before conclusions can be drawn. It is also probable that the technique of interviews can be improved so that very much better results will be obtained. It certainly deserves further study.

(3) Number of Semester Hours Premedical Credit.—This factor has been given attention because of the tendency in medical schools at the present time to demand three or four instead of two years premedical work before admitting students to the medical school. In those schools that do admit students with the minimum of two years' premedical work considerable preference is often given those who have more than the minimum of 60 semester hours required for entrance. Our report last year contained a study of the relation of semester hours

premedical work to success in the first year of medical work. To summarize our results here, studying almost a thousand students in medical schools admitting students with varying amounts of premedical credits from 60 semester hours up, we found a correlation between the number of premedical credits on admission and freshman medical grades of only slightly above zero. The distribution of grades in the group having only the minimum of 60 semester hours did not differ materially from the distribution of grades for the group having 120 or more semester hours. Exactly the same percentage in each group show freshman medical average of 90 or above, and the differentiation in other grade ranges was very slight between those who had two years of college premedical preparation and those who had four or more years.

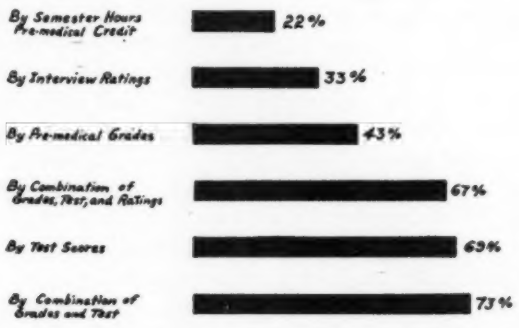

Fig. 9. Prediction of medical school failures by various criteria.

Chart 9 gives a summary of the efficiency of the various criteria in predicting failures in the freshman medical work.

Conclusions

From our study, it appears that Aptitude Tests furnish a very useful criterion for predicting success in the medical school. It seems further that best results can be obtained by a combination of test results with other criteria for selecting students, especially with premedical grades. No one criterion gives a perfect prediction and only prolonged experimentation will show what is the most reliable combination of criteria. The predictive value of personal interview ratings does not seem to be very high, but this factor should be studied further in a larger number of schools and under better controlled conditions.

Methods of Admitting Medical Students*

ROBERT C. LEWIS
University of Colorado School of Medicine

The subject of the selection of first year medical students should be one of vital interest not only to executive of medical schools but to all members of medical faculties. The difficulty of making wise selections, of weeding out the undesirables, of retaining those and only those who will carry through their medical course to successful completion with credit to themselves and honor to their school must be apparent to us all. How a wise selection may best be accomplished is a matter on which we all need advice. I trust that my remarks will elicit a general discussion that will be helpful to other schools as well as to our own.

In many of our medical schools, probably in most of them, the task of choosing a freshman class falls to the lot of a committee on admissions. Such a method relieves the dean of all responsibility for the selection of the class and gives to all others—to members of the faculty, to applicants who have been refused admission, to disgruntled parents, influential friends, and political acquaintances of such unfortunate applicants—some definite place to vent their none too friendly expressions of dissatisfaction and disgust. At the same time, by having a buffer to whom such individuals may be sent, by having, if I may be permitted to use a slangy expression, "a goat to whom the buck may be passed," the dean is relieved of much that might prove unpleasant.

As chairman of such a committee on admissions, I must say that I cannot do otherwise than admire the perspicacity of the dean who devised the system of placing the admission of students in the hands of a committee, as well as the general avidity with which other deans have adopted the plan. Certainly, by so doing, they have avoided much grief. Unfortunately, for members of admission committees, and I can say this most feelingly, no path of roses has been their lot. Their job is, to say the least, a thankless one.

Admission to University of Colorado School of Medicine

Our dean has asked me to outline to you our methods of admitting students to the University of Colorado School of Medicine. When it has been my good fortune from time to time to visit other medical schools, I have always made it a point to inquire about methods of

*Read at the Forty-first Annual Meeting of the Association of American Medical Colleges, held in Denver, Oct. 14-16, 1930.

selecting medical students. Obviously, the problems of different schools vary considerably, but, on the whole, I have gained much help toward the solution of our admission problems by the exchange of ideas at such times. Perhaps, you may find something in our procedure which may be of value to your school.

I am sorry that my audience does not contain more members of committees on admissions, for I should like to inform them all about one feature of our plan of procedure which they might well adopt. Our committee on admissions is not content to let the dean remain a non-functioning, ex-officio member of the committee. We ask and receive his cooperation to the end that he participates in all actions of the committee and, consequently, shares responsibility in the choosing of all students. There is much to be gained by having the dean actively interested in admissions. It is a distinct advantage to have his judgment and advice in choosing our students and to have it known that he helps personally in the selection of the class. Furthermore, it is a great help to the dean to have a first hand knowledge of admission cases when complaints are brought to him personally about allegedly unfair rejections of applicants for admission. Any change in our plan of admissions whereby the dean would no longer be an active participant in the selection of students would, in my opinion, be a grave mistake.

The method of admitting students to our school is not unlike that of many other institutions. The student is required to make formal application on a blank form furnished for that purpose and to present original transcripts of record from his high school or preparatory school and from all colleges or universities where his premedical work has been taken. If he has attended medical school previously, he must present an original transcript of his medical work and a letter of honorable dismissal from the dean. A recent photograph and a draft, or money order, for $25.00 in the case of residents, and $50.00 for nonresidents, are also required. The applicant is given two character reference blanks, modified from those used at one time, and perhaps still used, at Stanford University, and he is asked to present these for rating to his professors of biology and chemistry with the request that the completed forms be sent directly by these professors to our dean. The directions for making application, the application blank and the character reference blank which we use have been distributed, so that it will not be necessary for me to describe more fully our requirements in the way of records and recommendations.

The problem of the undesirable nonresident student, who may have attained an average above 80 per cent and is therefore eligible for admis-

sion, has been partly solved by the requirement of the $50.00 preliminary registration fee. Although this fee will be returned if the applicant is denied admission, it will be forfeited if the student fails to enter after he has been granted admission. Since this preliminary fee has been increased to $50.00, the large majority of those more undesirable, nonresident students who shop around by making application to several schools, a type familiar to us all, has ceased to seek admission to our school.

Grouping of Applicants

As a state institution, we feel that we must give preference to residents of the state and, furthermore, it is our desire to give first choice to those students who have prepared themselves in our own university. Consequently, after it is shown that the student has the necessary credits for admission to medical school—our requirements include in addition to those laid down by this Association somewhat more organic chemistry and one year of French or German—the applicants are divided into the following groups:

Group I.—Residents of Colorado, prepared at the University of Colorado, whose premedical work averages 75 per cent or better.

Group II.—Residents of Colorado, prepared elsewhere, whose premedical work averages 80 per cent or better.

Group III.—Nonresidents, prepared at the University of Colorado, average 75 per cent or better.

Group IV.—Nonresidents, prepared elsewhere, average 80 per cent or better.

Group V.—Residents, prepared at the University of Colorado, average below 75 per cent. (Practically none now admitted.)

Group VI.—Residents, prepared elsewhere, average below 80 per cent. (Only those with average of 75 per cent or better now admitted.)

Group VII.—Nonresidents, prepared at the University of Colorado, average below 75 per cent. (None now admitted.)

Group VIII.—Nonresidents, prepared elsewhere, average below 80 per cent. (None admitted.)

Applicants falling in this last group, nonresidents whose premedical average is below 80 per cent, are automatically excluded before the meeting of the committee to select the freshman class. They are informed at once that, as a state institution, our school can take only a limited number of nonresidents and that we choose from the nonresident applicants only those who have demonstrated superior scholastic ability. When the committee meets for the selection of the freshman class, action is taken on all students in the first group before those of

the second group are considered. Subsequently, each group is considered in the order named until the class is filled. Thus, preference is given to residents and to those students who have prepared in our own university.

Until recently most of the applicants from the first seven groups have been granted admission. However, since the adoption two years ago of the requirement that students in our medical school must average 75 per cent (70 per cent is our passing grade) before they may advance to the next class, those students, both residents and nonresidents, who have failed to average 75 per cent in their premedical work at the University of Colorado have been denied admission, and only a few of those residents who have averaged less than 80 per cent at other institutions, to be exact only those who have averaged 75 per cent or better, have been considered eligible. This means that recently our classes have been picked from the first four groups and from the better students in Group VI. This tightening of our requirements has made it possible for us to keep our freshman class limited to the 60 to 65 students whom we are able to accommodate, without the necessity of excluding any desirable applicants.

The Character References

Besides considering the applicant's scholastic rating, a great deal of weight is given to the character references, on which the student is designated as "above average," "average," or "below average" in personality, industry, judgment and common sense, reliability, initiative, cooperation, native ability, leadership, and physical vitality. A poor rating of a student who has a fair or even a good scholastic average is often considered of sufficient importance to cause the committee to deny his admission, especially if the two premedical professors agree in their estimate that the student is below average in many respects, or if the two have added under remarks on the rating such comments as "I do not believe that this student will make good," "this student has no aptitude for science," or "this man has a weak set of mental intestines." Of course, such notations are usually found on the character references of students who fall into one of the low scholarship groups, but the denial of an application for admission is made with much more confidence that no injustice is being done, when we know that a man's premedical teachers consider the applicant unsuited for the study of medicine.

Other Factors Considered

Certain additional factors are taken into consideration in a much less definite way. Other things being equal, a student who has had

more than the minimum requirement for admission is given preference over one who has only the bare minimum. Likewise, some special consideration is given to the student with a college degree.

When an applicant is reported in the character references as being below average in physical vitality, his name is given to our committee on student health and further information from the student's physician is sought. If investigation shows that the applicant's health is now good, or, if his physician states that he believes his patient's physical condition is sufficiently good to permit him to undertake the study of medicine, the student's health is not counted against him.

Health of Student

Much might be said about requiring good health as a prerequisite for the study of medicine. There is quite a difference of opinion generally, as well as among the members of our committee on admissions, concerning the attitude which should be taken toward the student who has had a severe physical breakdown but who is now sufficiently recovered to take his place in society again as a worker. Should he be excluded from medical school because he has an arrested case of tuberculosis, let us say, or should he be given the opportunity to continue toward his life's ambition of completing a medical course?

The argument may be made that it is not worth our time and effort to give a medical education to such a man, because he may not be able to give much of medical service following graduation. On the other hand, if this man is to be rehabilitated, should the work he has already taken be lost by turning him into another field of endeavor? Surely his rehabilitation can be the more quickly accomplished by allowing him to complete his medical course, especially if he has already taken part of it. Although my time is insufficient to discuss this problem thoroughly, I hope that others may do so, for it is one worthy of much consideration.

Fate of the Rejected Student

The question might well be asked as to what advice we give rejected students who may come to us for help with their problem. If the high school record is good, thereby giving convincing proof that the student has inherent ability, and if we feel satisfied from questioning him that his failure has been due to the fact that he has not applied himself in his college work, we suggest that he return to college and demonstrate that he is capable of doing creditable work.

Oftentimes, the jolt of not being admitted to medical school is all that is necessary to stimulate a student to do very satisfactory work when he returns for this additional preparation. He realizes now,

as he failed to do previously, that he has a definite goal at stake and he gets down to real serious work for the first time in his college career.

A striking example of such a case is that of a man who had a premedical average of about 70 per cent when he was considered for admission and was rejected a year ago. As his high school work had been much above average, he was advised to return to college. He did so, his his old stride again, and completed the year with an average above 90 per cent. This student has now been admitted and he will undoubtedly do creditable work throughout his medical course.

Of course, many students who apply for admission are in no way fitted to study medicine. Our advice to them is that they seek some other field of endeavor. To be sure, this advice is not always followed, but, at least, we have done our best to discourage such students from continuing to make an effort to enter a medical school.

The Student Who Is Dropped

Closely allied to this question of what shall be done with the student who has been denied admission to a medical school is the problem of the student who has been dropped on account of poor scholarship. Shall he be told that we are through with him forever and that it is useless for him to apply for readmission? Certainly, such an attitude is the equivalent of signing the death warrant of the student as far as a medical career is concerned. Even a letter from the dean to the effect that the student in question is a fine young gentleman, that probably in a new environment he will turn out to be a good student, etc., etc., will not gain for him admission to another school.

Why should one school wash the other's dirty linen? Does not each school have some responsibility for its own unfortunate students? Certainly, it would have been far fairer to the student for a school to have denied him admission than to have taken him under its wing only to cast him aside again the first time he has scholastic difficulties.

I believe that we shall all be willing to admit that nowhere along his entire educational path are there more adjustments to be made than at the time a student enters medical school. Is it any wonder, then, that some students with good credentials fal' by the wayside? Furthermore, the experiences of us all force us to admit that, even though a student has a premedical record sufficiently good to gain for him admission to a medical school, he may fail early in his course to come up to the scholastic requirements set for him.

Should we not, then, investigate each case carefully before we con-

clude that such failure proves the student to be hopeless as far as a medical education is concerned? Certainly, if this early failure were conclusive evidence that he could not make good in medicine, it would be useless to give him a second chance. It has been our feeling for a number of years that failure early in the medical course is not sufficient proof that a man has no aptitude for medicine. On this account we have granted readmission in the past few years to a number of students who have seemed to show promise that with a second opportunity they would get off on the right foot. The results of this experiment should prove of interest to you.

Survey of Readmitted Students

To the classes of the past seven school years, we have granted readmission to forty students who had failed following their first admission. The eighteen readmitted in 1925, 1926, and 1927 give us, perhaps, the best opportunity to judge whether or not the experiment has been a success, for they have had time to graduate or, at least, to gain admission to the senior year. Four of the eighteen failed to make good, six have ranked in the lower third of their class, seven in the middle third, and one in the upper third. Offhand, it might be said that the relative standing of these fourteen successful students is not very creditable. However, when one stops to remember that with each student dropped on account of poor scholarship the average standing of the survivors of the class is materially increased, one realizes that a standing in the lower third of a class is not so poor as it would first appear to be. The six students who stood in the lower third of their classes averaged 78, 81, 81, 81, 83, and 83, respectively, for their entire course, or for the first three years in the case of members of our present senior class. Certainly, this is not a bad record.

Ten students were granted readmission in 1928 and only one has been dropped on account of poor scholarship. The other nine have successfully completed their sophomore year. Four former students were granted readmission in 1929 and all have now entered the sophomore year. This summer eight students were given a chance to repeat the work of the first quarter of the freshman year and all did work sufficiently satisfactory to grant them permission to continue with the freshman work after Christmas.

On the whole, then, our data show that only five out of the forty students readmitted have thus far failed to make good when given a second trial. Under no circumstances should this be taken as an argument that all students who have failed should be granted readmission. Our contention is that when, and only when, there is sufficient reason

to believe that a student has ability even though he has failed to demonstrate it when first admitted, is it worth while to give him a second chance. Our plea is that all schools give such students that chance, for it cannot be expected that some other school will do so for them. I am positive that in any school where this is not being done for promising students, a real opportunity for service is being lost.

It may be said that the readmission of students is unfair to those who have not yet had a chance, for it will be necessary to exclude as many untried students as the number to whom readmission is granted. In our school we have obviated this difficulty by requiring that those readmitted take the work of the first quarter of their freshman year during the summer. Our courses in gross anatomy and microscopic anatomy are repeated in the summer and only when the repeaters are successful in completing these courses satisfactorily are they admitted to regular standing in the freshman class. In this way they take the places of those who fall by the wayside during the first part of their freshman year and no applicants who have sought admission are rejected to make places for those who are to be given their second chance. Furthermore, this method makes possible keeping our classes filled to capacity throughout the entire freshman year and during subsequent years.

The Foreign Student

Time will not permit me to do more than mention in passing the problem of the foreign student or the American student who has taken work in foreign countries and then applies for admission in an American medical school. Those who have attempted to solve the problem of evaluating such foreign credits would, no doubt, like advice as to the best method of dealing with such applications.

Several procedures adopted by other schools have not been made a part of our admission requirement. As already indicated, we do not require a health examination. Neither do we ask to have a personal interview with the applicant. We can see many advantages to the personal interview, but the difficulties attendant on putting it into practise have so far kept us from requiring it. Aptitude tests are not yet a part of our requirement, although we started giving them to students in our School of Nursing last year. We shall be much interested in Dr. Moss' report on these tests and in the recommendations of his committee. What action we shall take concerning these three important matters, I shall not attempt to prophesy.

The Scholastic Mortality

In conclusion, it may be well to emphasize one point. In spite of an honest attempt to choose wisely, our committee is cognizant of its apparent inability to select a class in which scholastic mortality is cut

to a minimum. Each year approximately from 20 to 25 per cent of our entering class fail to meet the requirements for advancement to the sophomore year. Although scholarship alone cannot be held responsible for such a high mortality, we are far from satisfied with the results obtained. Not until we are more successful in selecting applicants who will be able to complete their medical course with credit to themselves and honor to our school, shall we expect anything but criticism from our colleagues. As I said at the beginning, we need advice and help to solve this problem of how a wise selection of medical students may best be made. We shall welcome criticisms of our methods and suggestions for their improvement.

Discussion

DR. FREDERICK T. VAN BEUREN, JR., Columbia University: I want to compliment Dr. Lewis on the apparently very excellent method used in choosing students, and I should like to say that I do not think the Committee need be very much chagrined at having a considerable percentage of mistakes, because the men are chosen on the basis, in part at any rate, of scholarship and recommendation.

Scholarship grades mean one thing at one place, and another thing at another place. Until the Committee becomes sufficiently familiar with the actual value of a grade of 75 or 80 at a given school, I do not think they are in a position to know whether a man having such a grade at such a school is capable of doing the work in this particular school.

Recommendations come second in deceptiveness, perhaps, to statistics. I should say that nine-tenths of the recommendations that we get in our school are valueless from the point of view of actually rating the applicant as a desirable student.

The personal interview gives us more information regarding the student's ability than any other of the tests that we apply. One hopes that in the future the aptitude test that Dr. Moss' committee has been promulgating may be of very great value. So far as our particular school is concerned, I doubt if we shall ever be willing to give up the personality test by meeting applicants for a personal interview.

DR. WILLIAM PEPPER, University of Pennsylvania: I realize that local conditions must lead to somewhat different methods in the selection of students. Therefore, although I feel that the method you have here can probably not be improved on, in the case of our school we have found certain methods to be better for us. We speak of an Admission Committee and use that term in talking to disappointd students and parents and friends a great deal. As a matter of fact, it is a sort of paper committee which consists of my assistant, the college professor who evaluates credentials, and myself, I being the court of last resort. The number of applications we now have makes it rather difficult to have a committee of the faculty discuss each one of the hundreds of applications we get. It would take up too much of their time. So Dr. Thorpe, Dr. Shinn and myself shoulder the burden.

We have a little scheme which I think is very helpful in getting applications from students in a great many colleges, about 125 a year. We keep what

we call a college directory. We have a sheet of paper with the name of each college at the top of it, and as applications come in, we put down the name of the student under the heading of the college from which he applies. Then, early in the spring, I write a letter something like this. I have learned, so far as I can, the best man in the college to write to. I say:

"Dear Professor So-and-so: Won't you, or you with your colleagues, look over the list of names of applicants from your college and arrange them in one, two, three order. We won't be able to take all of these men. We only averaged about two from a college, other than our own, last year, so you see we can't take all the ten, fifteen or twenty of your students. We should like to get the best. Don't arrange them merely in the order of their scholastic standing but try to guess which of these men will amount to the most ten or fifteen years from now as general practitioners, or specialists, or research workers, or teachers, men who will be the greatest credit to you and to us."

Then we get back a list. "Mr. Jones is far and away the best man. Then comes Smith and Green. There is no difference between them." Or it may come in one, two, three. Then, of course, it is up to us to try to decide whether the top five on the Lafayette list are better than the top two on the Swarthmore list, or some other college. That is where our difficulty comes in.

Getting our recommendations in that way from these college professors we find it a great deal better than trying to compare the letter of recommendation from the professor of biology about one man in a certain college, and the letter from the professor of chemistry in the same college. They both sound as if the men were equally good. When you ask them to put them down in one, two, three order, though, you find they pretty well agree that one is better than the other.

We have tried to see as many applicants as possible. As Dr. Van Beuren says, we too, feel that the personal interview is very helpful. We don't insist on it, of course, because it is not right to ask a man to come a long distance when his chance of getting in is numerically as small as it is today.

The question raised by Dr. Moss about the physical condition of the student is one to which we have paid no attention in the past, but want to in the future. This winter we made roentgen examinations of 200 or 250 of our premedical students in our own college, and of nearly 400 of our medical students and found a very striking fact, that of the college students there were only about half a dozen who showed any signs of tuberculous lesions. In the medical students there was a progressive incidence each year: in the first year, three or four; in the second year, six or eight; in the third year about twelve or fourteen; and in the fourth year class there were about twenty. It is steadily mounting. We haven't had time to analyze those figures, but I should like to bring that subject up next year for discussion.

We have been having many cases of students breaking down and having to go to sanatoriums during their medical courses, staying away for a year, and some of them for several years. Most of them, I am glad to say, eventually come back and are able to finish their courses. There has been a distinct economic loss to the students and the school through some of them breaking down. I do not know how we can do more than watch and examine the students in our own college. The difficulty of requiring a physical examination of applicants at a distance is not easily solved.

In regard to the question of the readmission of students who failed, that today is one of the most distressing problems for a dean to decide. In the old days it was more easily possible for the student who was dropped from the school to gain admission somewhere else, to try again. Today, as you all know, it is well nigh impossible. Ten years ago we passed a rule that no student who failed at the end of the first year could repeat the year but must leave the school. At that time, we were brought to adopt this rule by the fact that that year there were seventeen students who repeated their first year's work, and not knowing how many there would be and having filled up the class with new students we were suddenly deluged with the seventeen repeaters with the consequence of having a class which we felt was too large. Not being on the quarter system, we could not try those men out during the summer. In fact, we do not give our re-examinations until the middle of September and do not know whether a man is going to go on with his class until the end of September, or whether we are going to drop him. Because he does not learn until the end of September that he has been dropped, it makes it still more difficult for him to get into some other school.

At the time we had these seventeen repeaters, we decided to study how these former repeaters had done in our school. We took 100 consecutive cases of students who had repeated their first year, going back far enough so that we would have only those who had a chance to graduate, and we found that fifty of them never did graduate and that the other fifty all graduated below the average of their class. There was not a single man in the 100 who had really made good.

Of course, changes have come in the last ten years due to the increasing number of applicants, and as a consequence we do not admit so many poor students. They are a more selected group, and I do believe if we allow our men to repeat the first year now we will not get anything like those figures that we got ten years ago.

Our greatest difficulty with students failing, wishing then to repeat the year, is brought about by the fact that we have always made it a rule to admit the sons of our alumni who meet our entrance requirements no matter how poor their scholastic records. We felt that was only right; that the University was constantly asking for money from the alumni and that the least we could do in return was to admit their sons if they met our entrance requirements. The result is that each year three or four of these boys who have done very badly in college fail in medical school, and I do not know whether it would be easier to withstand the scorn of the parents by not taking them in, or face the doctors when we tell them their boys have been dropped.

Our mortality, I am glad to say, is steadily dropping and I still hope, despite this provision of the admission of the sons of alumni, that we may some day pick out a perfect class. The best we have done is to lose, out of a class of 110, at the end of the first year, only three. I was very much delighted. The next year we lost fifteen. This year we lost but five. We are getting down within shooting range of my ambition of a perfect class.

Dr. Beverly Douglas (Vanderbilt University): In deciding upon the value of these tests, the first thing one should consider is whether or not there is a definite need for any better method of picking students. I think we are all agreed that there is a definite need.

It may be made a little more definite in the case of Vanderbilt University by the simple exposition of a few facts about the southern medical schools. We have made a study of the premedical grades turned in to us with a view to seeing if we could rely on them as an accurate index of any particular man.

We find from this study, just to give a few instances, that in the case of five southern schools, the averages of several different students on entrance was from B to B plus. The first year grades of these students averaged 73.5 per cent. In other words, for a very high premedical grade, we had a very low first year medical grade. Similarly, in five other schools in the South a similar premedical average gave 85.7 per cent, or about 10 per cent higher. Of course, there are certain individual factors that enter into this. It may be taken, however, as a fair index of the value of these grades.

Furthermore, we then studied the grades of two men in each individual school comparatively, and we found that there were a great many discrepancies. Some men with high grades would promptly fail in school and others with low grades would behave very creditably. I know that this is the experience of the majority of the people here because already this morning there have been expressions to the effect, that one could not depend on grades alone.

I am very certain that we all feel greatly indebted to this Committee, and particularly to Dr. Moss, who has devised the test and who has carried on the active work of the test, for his very excellent summing up of the results.

I feel in the case of my own school, Vanderbilt, that the test has shown up even better on the few people tested than he has made out from these general averages. I should like, just briefly, to review one or two of these instances because I feel it would be helpful.

His letter to us regarding students reads as follows: "Student B made the lowest score of any man in your group. His record shows withdrawal and an average of only 70 on the three subjects reported. J. B., the next lowest man on the test, also shows withdrawal with an average of 63 on the three grades reported. Student C shows a slight exception in that he made a little bit over 70 and stayed in school, but he was the next lowest. The next man had the next lowest score and showed withdrawal, although he had an average of 81 on three subjects reported." And so on.

Turning to the highest men, I need only to say that the highest man in the class was the highest man in the test. The high grades also correlated. I imagine the correlation factor would be somewhere in the neighborhood of 75 per cent for the Vanderbilt students' test. This is certainly a far better correlation than the grades of our applicants for admission has ever given.

Dr. W. C. MacTavish (New York University): I have had considerable experience teaching in the medical school and in recent years I have had charge of a large premedical group at the Washington Square College of New York University. Many of you have been deluged with letters from me about students applying for admission. I feel that I know something about the problem, especially from the viewpoint of the premedical school.

We gave this test at our school to a fairly large group, and my colleagues in the biology, physics and chemistry departments all feel the test was very well devised and an excellent one. The results, I think, were rather favorable.

The tests have been given for the last two years in the medical schools and, in my opinion, have proved that they have definite value. The chief purpose

of the test, however, should be to decide whether or not a student is desirable. To that end, I agree very heartily with the recommendation of the Chairman of the Committee that this test be given at all schools where premedical work is given. I feel that any school that prepares or graduates more than ten candidates each year for the medical schools should be required to give the test, because we have all found by comparing grades submitted in premedical reports with actual accomplishment in the medical schools that there is a wide difference in the values of grades presented from various schools.

At our own medical school we have admitted for some years students from a definite school, and the records of these students are becoming more and more unsatisfactory. Last year we had six or seven from that school, five or six of whom failed in the first year. The students seemed all right, but there was evidently something wrong with their premedical training.

I think, therefore, that if this test is adopted all students applying for admission to medical schools should be required to take it. The student should be required to pay the cost, and the results submitted to the medical schools. I think the facts presented here today show that you would thus have an added means of determining whether or not a student was a fit candidate for the study of medicine.

I should like also to say a word about personal interviews. In the course of the work of my Committee on Recommendations, I make it a point to interview all students who expect to apply for admission to medical schools three or four times during the last semester of the premedical course. Inasmuch as we have them for three years, I, or the fellow members of my committee get a chance to observe them some twelve or fifteen times during that period. We gather information also from the laboratory instructors who are required to keep a careful record of the student's work—not only his scholastic average, but his personality, manners, personal appearance, laboratory technic, and so on, is all taken into consideration. We find that these reports harmonize very well and we base our recommendation upon that information.

When students appear before me for personal interviews they are usually very careful in the details of their personal appearance, in fact, almost Beau Brummels. They are shaven, some even manicured; they wear their best clothes and try to make a good impression. In some cases they are quite nervous. They are not sure as to what I may say to them and often make a poor impression in their speech, manners, etc. Some possess poise and are able to talk without restraint.

That is what I fear occurs in medical school interviews. The student appears for an interview and is very self-conscious. It is very important for him to get into medical school and he meets four or five men whom he has never seen before, and quite often they are not very friendly. His personal appearance, you may guarantee, is the best he can make it that day even though he may be a sloppy individual on other occasions, but he is very nervous and does not make a good impression.

I am very often amused when some student of ours, whom we regard as not altogether desirable even though his scholastic record is high, goes to the medical school for an interview. All during the term he has been very careless; he has not cared about his personal appearance, his manners, or anything else but on this occasion he is on guard and more careful of these details. He is a

very glib talker. One of the questions commonly asked is: Why are you studying medicine? This student has all sorts of neat ideas about helping the poor, research, and so on, and he makes a good impression. This one interview at the medical school will very often make it possible for him to be accepted. Therefore, I regard personal interviews by the Admission Committee of the medical school as rather doubtful in aiding them to form a fair opinion of a student's acceptability.

I know you can size up a man very often by seeing him once or twice, but I am afraid mistakes are made more often than we realize.

There is one remark I should like to make about the system here at Colorado. In looking over the bulletin, I notice the students are required to bring original transcripts of their high school record and original transcripts from whatever school they have attended. It is very difficult for students, in summer, to get original transcripts of their high school records. Except in some of the large cities, the high schools are closed at that time, and if the school at which the student has taken his premedical work has certified to his high school record, that should be sufficient. The same thing applies to other schools. If he takes work at New York University and decides to transfer to Columbia he receives part credit only for courses in which he received a grade below C. A student transferring loses credit, and usually that discourages him from so doing. If, then, you accept the separate transcript from each school, you will be giving the student more credit than he actually deserves.

With further reference to the aptitude test, I should say that we have a large group of premedical students at New York University. I think the training they receive is good. We happen to have in the biology department a man who for many years was professor in the anatomical department of the medical school, and several other members of the faculty have had considerable experience in teaching medical students; we feel that we do know something about what is required and we have outlined our course on that basis. We are, however, always open to suggestions and ready to make the necessary changes in our course, to keep up to date.

Another thing I should like to emphasize is that most of you are deluged with applications from students who have no chance of being accepted at your schools. I think you could obviate much of this if you would definitely state which students are acceptable. A number of schools do not accept students from outside the state, and you could avoid receiving some 200 to 300 applications if this fact were made clear to the schools from whose students you receive applications.

Also, some schools do not accept applications from men whose scholastic standing is below a certain grade, and if you make that clear to the schools from which students are applying you will not be bothered with so many applications.

Dr. E. S. Ryerson, University of Toronto: We have been interested in the problem of the limitation of students in the University of Toronto. Some years ago the question came up and we had the cooperation of our professor of psychology, Professor Bott. In order to see whether the matriculation record of a student was in any way of value in predicting how he would do in his medical course, he took two classes of students; between 100 and 150 in number, who had graduated in medicine where he had complete access to their records in the medical course. He went back to the Department of Education of the

province and obtained their matriculation records and worked out the relationship between the standing in the matriculation and the standing in the medical course. He found, as a result, that there was absolutely no correlation whatsoever. It was so low it was completely valueless.

He took the grades of the same classes in the premedical subjects and correlated those with their further medical course, and he found he had very close correlation, as high as between seven and eight in relationship, particularly the subject of biology.

In that way, I think he absolutely agreed with Dr. Moss that the premedical subjects are unquestionably of value, and I do not think any of us question the value of premedical grades as being of use in determining whether a student will be successful in his medical course.

Personally, I endeavored to find out how a student who had failed in his premedical work, which is part of our course in Toronto and under our medical faculty where we have very close cooperation, did in his medical course. I took a period of ten years of students who had failures or had been unsuccessful in their first year examinations, and I found that over this period of ten years there were 440 students. Of those 440, only 220 ultimately graduated, or 50 per cent. Of the 50 per cent that did graduate, only 10 per cent succeeded in getting through the remainder of their course without further failures or conditions, which again showed they were unquestionably the men who had been weak in the premedical and were unquestionably weak in their subsequent course.

In regard to the aptitude test, which was given only to those students who volunteered for it at Toronto, and only about 50 per cent of the class tried it, a great many were unfamiliar with the method of examination and in that way there was a little difficulty from the standpoint of the mechanics of the test, which is just a question that might be considered in the way of possibly making this of greater value in arriving at a conclusion as to whether they are more successful than others.

Personally, I am strongly in favor of something of this kind, and I think if we can work at it we will ultimately arrive at something of the greatest value.

Dr. L. S. Schmitt, University of California: I believe that Dr. Moss and the members of this Committee should be congratulated upon the progress report they have made today on this well controlled experiment. I believe the experiment should be continued.

From previous studies that we have made in the past, there is a wide difference in the results of performance in preclinical subjects as compared to the results in clinical subjects. I think we should continue the experiment to determine the predictive value of the aptitude test in relation to performance in the clinical subjects.

We are very fortunately situated in the Medical School of the University of California in endeavoring to determine the predictive value of the aptitude test in relation to premedical grades. We should specify what we mean by premedical grades. We weigh the institution from which the applicant comes. That weight is determined by the past performance of the previous applicants from that specific institution. We then give a weight of 60 to the required premedical subjects, namely, physics, chemistry, biology, and so forth, and a weight of 40 to all others.

Upon this basis, a comparison between the results of the aptitude test for the class of 1929, determined in a somewhat different way than that demonstrated by Dr. Moss, showed that the medium of that class was 183.7 of the score—rather high, I am told—the average was 178.7. In other words, based on the aptitude test there were 45 per cent above the average, and 55 per cent below the average. Based on our method of admission as I have just described it—and, by the way, there is a physical examination required as well—the median of the index figure determined by this formula was 2.223; the average, 2.110. In other words, there was 38.3 above the average, and 61.6 below the average on the premedical grades, a variation of 7 per cent between the two tests.

A comparison of the aptitude tests with actual performance at the end of the first year, taking as our criterion the rank in the aptitude test and the rank by performance at the end of the first year, in which is given anatomy, physiology and biochemistry, and dividing the class into three groups, the first group resulted in 9 remaining in the first third; 7 dropped to the second third, and 3 to the third third. Of the middle group, 9 went to the first third, 5 remained in the second third, and 5 dropped to the third third. Of the third group of the aptitude test, 1 went to the first group, 8 went up to the second group, and 11 remained in the third group.

A study of certain individuals, however, is rather interesting. The young woman who passed No. 1 with the highest score in the aptitude test ranked No. 54 at the end of the first year in a class of 59. No. 27 in the aptitude test went to No. 2 on performance. No. 34 in the aptitude test went to No. 7 on performance. I am picking out some of the outstanding cases which, as Dr. Moss has stated, should not be taken except to show that this test is not infallible.

Of the three who were dropped on performance—and by performance I mean that they did not have a sufficient number of grade points and were then subjected to a comprehensive examination and failed the examination—one was No. 37 in the aptitude test, one was No. 48, and one was No. 60. You can see the predictive value if we had used this. As Dr. Moss has stated, the predictive value of performance at the end of the first year was 50. The predictive value of our method of admission was 43. A combination of the two would have resulted in a predictive value of 59, and I am sure that all of us who have worked for years on admission to medical schools would have been glad to have had anything that could have given us a predictive value of 59.

Dr. Edward S. Thorpe, Jr., University of Pennsylvania: I should like to say a word about a school which still uses the personal interview.

This morning we have somewhat ascended the heights of calculus with our good friends Dr. Moss and Dr. Schmitt, and have shed a tear with Dr. Lewis on the graves of those who have flunked and would like to repeat. I should like to say a word or two which might help to lighten the load imposed upon deans and admission committees in the selection of students for a medical school.

It seems to me, since medicine is still an art as well as a science, that character is just as important as grades. We cannot bring out character in the intelligence test. I think we can spot character, perhaps not by the color of the necktie, with a personal interview. At the present time, of course, we

are merely making a practical application of the doctrine of Malthus in the selection of medical students. It is not working out very well, but we are doing the best we can.

My suggestion is, and my hope is that we may be able to get more help from our good friends in the colleges, not using so much these personal interviews which Dr. MacTavish has spoken of because there the boy has a chance to prepare for it, but the daily impressions gained by these professors in the colleges concerning their students. They meet these boys every day. They see them every day, and they see them when they do not have on their best neckties. We would like to get the impression of these professors as to the character of these boys.

If we continue to devise new intelligence tests and new forms, I think we shall be in great danger of depleting the resources of this country and Canada. Perhaps some of you remember that famous book by H. G. Wells, "The Outline of History," in which he has a very interesting comment to make concerning Ireland. He described the dark, dreary, cloudy, rainy climate of Ireland and says that about all the poor people of Ireland could do was to raise potatoes and in the winter time lead a family life. That resulted in a remarkable increase in the population of Ireland between the years 1840 and 1860 of some 800 per cent, at which time the poor Irishman's potatoes gave out and a tremendous emigration took place from Ireland to the United States.

I am just wondering whether, if we increase these various tests and application forms, and what not, in spite of the great forests of this country and Canada, there may not be a great shortage in wood pulp as a result of that.

Some of these students may be forced, in the course of time at the end of their college careers, when they have been highly prepared for the study of medicine, to emigrate into such professions as the ministry, or selling bonds and insurance.

DR. IRVING S. CUTTER, Northwestern University: At Northwestern, 45 per cent of the students admitted to the freshman medical class come from the college of liberal arts on the Evanston campus. There we have an individual, a member of the biological faculty, who is known as a premedical adviser. He is constantly in touch with this rather large group of our college students preparing for medicine. He has attempted to work out a sort of quotient under which he can rate them, and a much more accurate determining factor has been shown by the quotient which he calls the biological quotient rather than a second quotient which he also worked out which was known as the chemical-physical-mathematical quotient.

He rates each student who applies, not alone on his ability, as shown by his grades, but by the constant factor of contact with the student personally through the various instructors of that student on that campus.

I believe there is a rather definite tendency to the establishment of premedical advisers in many of the colleges of liberal arts. In fact, that has been shown to be true through the colleges of Michigan, Illinois, Indiana, and elsewhere. I think we ought not overlook the fact that frequently the premedical adviser can give us, after all, the best and most reliable data as to the students.

DR. FRED C. ZAPFFE, Secretary-Treasurer: You will be interested to get a few figures that have some bearing on this work. A few years ago I made

a study of the students of fifteen years from all the medical schools in the United States. All of them came into medical schools before the day of tests for admission. They came on the basis of certain regulations that were laid down for admission to medical schools.

There were extremely slight variations from year to year. Twenty-five per cent of those who were admitted failed to graduate; 15 per cent were eliminated after the first year; about 8 per cent were eliminated after the second year.

Last year I made a study for the Commission on Medical Education of what became of the graduates of three selected years. I found that between 22 and 24 per cent of those who graduated in medicine had dropped out of the practice of medicine. That does not include the men who died, but merely the men who remained alive and for one reason or another failed to continue in practice.

I felt at the time that that threw a rather interesting sidelight on these tests. We are making these tests to determine fitness to study medicine. Evidently there is another test that should be made, to determine the fitness to practice medicine. So far, the men themselves have eliminated nearly 25 per cent who were not fit to practice, or who preferred not to practice because they failed to make a success of it, or who preferred to go into other lines of work afterward.

Dr. Robert C. Lewis, University of Colorado: The discussion has been much more interesting to me than the original paper. I think we may all agree that recommendations are oftentimes valueless and belong in the same class with some kinds of statistics, and that is said with no desire to cast any reflections on Dr. Moss' work.

The personal interview as a means of judging character is of great interest. That has been discussed, and I shall say no more about it.

We feel that our character references fall decidedly short of getting what we wish in the way of recommendations, but we do feel that by having two of them, particularly if the two agree and, furthermore, if they come from people we know in our own institution or from neighboring institutions where we know the men personally, they mean a great deal to us, especially where a man will call a spade a spade and come right out and tell all he can about a student, and be honest.

I was much interested in Dr. Pepper's remarks about the statistics of the 100 students, and I feel quite sure that if we had taken students back over the years, our experience would have been the same as that of the University of Pennsylvania. However, the 40 students I used in my study were men who had been selected. Probably during that time there had been at least 150 men dropped, of whom only 40 were granted re-admission, and then only after we had made as thorough investigation as possible as to the probable fitness of these people to have another chance. We do not, by any means, re-admit everybody.

Also, as to the comment on sons of doctors, our sons of doctors are our greatest problem.

I was much interested in the aptitude tests and the failure of correlation that was brought out between the freshman medical grades and the premedical grades, especially in the middle third. They do not agree very well. That is the experience we have all had.

Dr. MacTavish spoke of the original high school transcript requirement. We are doing away with that. We had it because it was one of the rules of our University that all students must present original transcripts from high schools. At our last faculty meeting we recommended that as far as the medical school was concerned we no longer require the original transcript from high schools.

After all, recommendations from people who know the students best are of more value than anything else we can get. We have a number of men whom we know personally who help us a great deal in selecting the group. When a recommendation comes from one whom we do not know so well, we do not find these recommendations as helpful.

It is too bad that we are located so far away from other schools and do not have the possibility of getting acquainted with all the men who send students to us. If that were not the case, we would get a great deal more help.

Dr. F. A. Moss, George Washington University: I should like to point out that the test as used is not a general intelligence test, nor is it designed to measure the intelligence quotient of applicants. It is very definitely a test designed to predict success in medical school studies.

I agree that the test results should be studied on all of the students who have already taken it through their junior and senior years. We can do this without giving any additional tests, by merely getting from the medical schools concerned the grades of the students in these last two years.

It is interesting that the test predicted the grades as well in the sophomore year of medicine as it did in the freshman year. We have only one school in which it has been given in the junior year. That happens to be George Washington University. The grades in the junior year correlated just as well with the test as they did in the sophomore and freshman years.

I am thoroughly convinced that personal interviews will give you something that the other things do not give. I think in time to come a better method of conducting them may be devised. We have tried in two schools getting ratings from premedical instructors, having them rate the students from one to four, four being those the interviewers would put in the highest group and take without any question. Their ratings were not as successful as expected. In most cases the premedical adviser would probably give more reliable ratings than the premedical instructors. In some instances such will not be the case. I happen to be a premedical adviser, and having tried for two years I am not nearly as convinced as I once was of my ability to predict success in medical school by my knowledge of the student, or to predict one's character traits from having associated with him.

The measurement of character traits is extremely difficult. At the present time Vanderbilt University is working on a scale that looks promising. I believe that Dr. Douglas hopes to improve it and try it out this year. We are also hoping to try it at George Washington University. If it gives good results we shall probably have more to say about it later.

Instruction in Anatomy in Germany

J. LeRoy Conel
Professor of Anatomy, Boston University School of Medicine

In Germany anatomy and other medical subjects are always taught by the faculty of medicine belonging to a university. There are twenty-three medical schools, all of which are departments of the twenty-three universities located throughout the eighteen states of the Reich. The universities are maintained and controlled by the states in which they are located, but the instruction is standardized throughout the entire country. The difference in wealth of the various states is reflected in the universities, the more prosperous states usually providing better buildings and more facilities for teaching and research than the less wealthy ones can afford.

In every university the faculty of medicine is divided into institutes, each of which is usually housed in a separate building. The institutes are usually grouped around the hospitals, and with them form a medical center. Most of the Germany universities are old, and many of the original buildings are being used at the present time. Very few of the institutes of anatomy are housed in modern buildings.

Teaching Staff

Gross and microscopical anatomy are usually merged, and constitute the Institute of Anatomy. The chief officer of instruction is called the director of the institute. When it becomes necessary to select a director, the faculty of medicine appoints a committee for the purpose. This committee considers the qualifications of desirable men, each of whom must be a professor in a faculty of medicine in Germany, Austria, Switzerland, Sweden, Norway, Denmark or Holland. After due deliberation the committee submits to the minister of education of the state in which the university is located a list of nominees. After considering extensive written reports prepared by the secretary of education, who becomes well informed regarding the qualifications, political affiliations and general activities of all the nominees, the minister appoints one of them to the office. The man appointed is not always the one who heads the list submitted by the committee, and even may be the last one named.

The director has entire charge of the teaching of all required courses in his institute, and therefore assigns the lectures, and appoints the

members of the staff who are to assist him in teaching his own courses. He may appoint new teachers of the rank of assistant, and may discharge them at will, as they have no official standing. All teachers above the rank of assistant are appointed by the faculty, and the director can not discharge them.

The director prepares the budget for the institute and attends to all matters of administration. The budget of one of the smaller institutes is approximately 20,000 R. M. per year, and for one of the larger institutes 60,000 R. M., not including salaries. The business affairs are handled by a verwalter, appointed by the state.

The teachers in the institutes of anatomy are variously ranked as follows, proceeding from the lowest to the highest:

NICHTBEAMTETE ASSISTENT (Unofficial Assistant). These teachers are appointed or discharged by the director. They must be men or women who have completed the work in a medical school, and have passed the Staats examination. The assistants receive a regular salary, paid by the state, and are included in the state pension plan. They are state employees, but not state officials, as are all teachers in the ranks above this. After five or six years of satisfactory service, and after having done some creditable research work, they may be recommended by the director for promotion to the next higher rank.

BEAMTETE ASSISTENT (Official Assistant; also called Prosector). Teachers of this rank are appointed by the faculty of medicine upon recommendation by the director. They are not allowed to give lectures, but act as teaching assistants in the laboratories. The salary is paid by the state, as is also a pension upon retirement. These teachers, and all others above this rank, are appointed for life, and can be discharged only when proved guilty of gross immorality or some major crime, after trial by the university senate. Having completed a few years of satisfactory service and done some first class research work, the beamtete assistant may be promoted to the next higher rank by the faculty, upon recommendation of the director. Any teacher ranking as a beamtete assistant, or higher, is a state official, and as such must be given space in the institute for doing his teaching and research work, and must be supplied with all necessary materials. The director of the institute has no authority in these matters.

PRIVATDOZENT. These teachers are permitted to give lectures and to collect fees from the students. Only when appointed by the director to act as his teaching assistants do they receive a salary from the state. They may refuse to accept such an appointment, or may resign from it;

but if not acting as teaching assistants, they receive no pay other than the fees collected from students for lectures. Privatdozents are provided with a private laboratory and such materials as are required for conducting their investigations. They have the same tenure of office as beamtete assistants and professors.

PROFESSORS. When a professor is to be appointed in an institute, the medical faculty considers desirable candidates, and submits a list of three names to the minister of education of the state. The minister sends the list to the secretary of education, who prepares an elaborate written report upon each nominee, and indicates his choice. The minister usually appoints the candidate chosen by the secretary of education, but may appoint another, or even call for a new list from the faculty of medicine. Once appointed, a professor holds his position for life, and can be removed only upon conviction of a major crime or gross immorality, after trial by the university senate and the minister of education.

Exchange of Professors

It often happens that a professor is called from one university by another. He is usually offered a salary which is higher than the maximum salary paid to professors. The minister of education in each state has a fund which can be drawn upon for such a purpose. The wealthier states, such as Prussia, have larger funds of this kind and can offer higher salaries than other states. A call to another university, "primo et unico loco," is just claim for promotion or increase in salary in his own university if the professor chooses to remain.

Professional Titles

Professors are designated by various titles, according to the nature of their positions. Theoretically, professors are all of the same rank, but practically the titles serve as a distinction, and are as follows, listed in order from the lowest to the highest:

1. Nichtplanmässige ausserordentliche professors (professors who are not on the regular teaching staff). These men or women are next above the privatdozents in rank, and are subject to much the same conditions as the latter. In fact, this type of professorship is regarded as a mere title, conferred by the faculty of medicine upon privatdozents as a reward for additional service and exceptional research work. Unless he is a teaching assistant to the director, a professor in this class receives no salary from the state. If the director appoints him as a teaching assistant, he may or may not accept the appointment, or may resign at any time after having accepted, by giving due notice to the director.

Privatdozents and professors of this class who desire to give lectures to students must first ask the permission of the director. If he refuses, they may petition the faculty of medicine. If the latter refuses, they may petition the university senate, and even the minister of education. There is usually no difficulty, however, and the director approves the proposed course of lectures. It sometimes happens, though, that a privatdozent or a professor is on unfriendly terms with the director, and the latter will not approve the course of lectures. If the teacher appeals to a higher authority and receives permission to give the lectures, the director can make it uncomfortable for him by giving a parallel course of lectures, and thus take students away from him.

Professors of this rank are entitled to a laboratory and supplies needed for their research work. If their investigative work is distinctive, they are eligible for promotion to the next higher rank.

The director usually recommends for promotion in all cases. Any beamtete assistant or nichtplanmässige ausserordentliche professor, however, who thinks he is entitled to promotion, but who is denied the recommendation of the director, may present his claims to the medical faculty, to the university senate, and even to the minister of education. It sometimes happens that promotions are made by one of these authorities although the director refuses his sanction.

2. Planmässige ausserordentliche professors. These professors are on the regular teaching staff, and receive a salary from the state. Part of the lectures and laboratory work in the required courses are assigned to them, and they receive student fees for this work. Usually there are only one or two professors of this rank in an institute.

3. Ordentliche öffentliche professors. In the institutes where gross and microscopical anatomy are merged into one department, there is usually only one professor of this rank, which is the highest. In those institutes where gross and microcopical anatomy constitute separate departments, there are two ordentliche professors, and occasionally there is a third in charge of a separate department of embryology. The merging of all divisions of instruction into one department under the director is not confined to the small institutes of anatomy, but also occurs in some of the largest. It is a matter of choice on the part of the director.

While Germany was an empire, the honorary title of geheimrat (privy councillor) was conferred by the emperor upon some ordentliche professors. They were advisers to the emperor. This was the highest of the professional titles. It is no longer given, but is still used in addressing those who possess it.

Salaries

The regular salaries paid to the teachers in the universities are uniform throughout Germany. As stated above, in exceptional cases the regular salary of a professor may be augmented by payment from a special fund. The regular salaries for the various ranks of university teachers are shown on following page.

When a child reaches the age of sixteen years, the allowance for it is discontinued unless it is mentally or physically incapable of assisting in earning a living; in this case, the allowance is continued until the child is twenty-one years old.

In addition to their regular salaries, all teachers from privatdozents up increase their incomes by collecting fees from students who attend their lectures or take their laboratory courses. The director profits most from student fees, for he has first choice of all lectures and laboratory courses. This is an important reason why the position of director is coveted. If there are two ordentliche professors in the institute, the lectures and laboratory work in required courses are divided between them, one usually teaching gross anatomy, the other histology and embryology. When these departments are merged, and the director is the only ordentliche professor, he usually reserves for himself as much of the lecturing and directing of laboratory work in the required courses as he can possibly find the time to do. By so doing, he receives the bulk of the student fees, but his research work suffers in consequence. Everywhere in Germany, however, the classes are so large that the director can not do the work without help. If there are some planmässige ausserordentliche professors in the institute, the director is obliged to assign some of the required work to them. He will also appoint various teachers who receive no regular salary, viz., nichtplanmässige ausserordentliche professors and privatdozents, as his assistants in the laboratory, and they then become enrolled as beamtete assistants, and receive a regular salary as such, plus whatever the director is disposed to pay them out of the student fees which he receives. In many institutes the writer heard complaints that the directors are much less liberal than formerly in sharing student fees with their assistants. There is a tendency on the part of directors to go in for money-making, and some of them in the larger institutes have an income from their salaries and student fees as high as 60,000 R. M. ($15,000) per year. The director may also appoint nichtbeamtete assistants and advanced students to help in the laboratory work, and to these he pays a voluntary sum out of the student fees.

SALARIES OF NICHTBEAMTETE ASSISTANTS

Years of Service	1st & 2nd	3rd & 4th	5th	6th & 7th	8th & 9th	10th & 11th	12th & 13th	14th & 15th	16th & 17th	18th & 19th	20th or more
R. Marks per year	3600	3900	4200	4400	4900	5400	5800	6200	6600	7000	7400

For the dwelling allowances the cities are divided into five classes (ortsklasse) based upon estimated differences in the costs of living.

DWELLING ALLOWANCE FOR NICHTBEAMTETE ASSISTANTS

Ortsklasse	Special	A	B	C	D	
Married	921	864	633	519	381	R. Marks per year
Unmarried	693	585	486	381	279	" "

Following are tables for the teachers who have official standing:

SALARIES FOR BEAMTETE ASSISTANTS AND PROFESSORS

Years of Service	1st & 2nd	3rd & 4th	5th & 6th	7th & 8th	9th & 10th	11th & 12th	13th & 14th	15th & 16th	17th & 18th	19th & 20th	21st or more	
Beamtete Ass'ts	4800	5200	5600	6000	6400	6800	7200	7500	7800	8100	8400	R. Marks per year
Pl. Ausser. Professors	5700	6200	6700	7200	7700	8200	8600	9000 (maximum)				" "
Ordent. Professors	7200	7800	8400	9000	9600	10,100	10,600	11,100	11,600	12,100	12,600	" "

DWELLING ALLOWANCE FOR BEAMTETE ASSISTANTS AND PROFESSORS

Ortsklasse	Special	A	B	C	D	
Beamtete Assistants	1152	1008	792	648	474	R. Marks per year
All Professors	1584	1368	1080	864	648	" "

ALLOWANCE FOR CHILDREN

Number of Children	1st & 2nd	3rd & 4th	5th or more	
Nichtbeamtete Assistants	16	20	24	R. Marks per month for each child
Beamtete Ass'ts and Professors	20	25	30	" " " "

Pensions

All salaried teachers pay ten per cent of their salaries toward the pension fund, in which they all participate upon retirement. The retiring age varies in the different states, from sixty-five years up.

At retirement a teacher receives sixty-eight per cent of his last salary plus the dwelling allowance, and for each child less than twenty-one years old he receives an allowance as follows:

For the first and second child.....20 R. M. each per month
For the third and fourth child.....25 R. M. each per month
For the fifth child or more.....30 R. M. each per month

In case of death before or after retirement, the widow receives during her entire life time sixty per cent of the teacher's pension, and the above allowance for each child under twenty-one years of age.

Students

The preliminary education of university students is much the same throughout Germany. The scheme described here is that used in Bavaria. Elementary training is given in the Volkschule during the years of six to ten inclusive. The pupils spend the next nine years in the secondary schools, of which there are several different kinds. The oldest, and the only one for many years, is the Gymnasium, in which emphasis is placed upon the classics. Latin is taught during all the nine years, Greek, French and English during five years. The Gymnasium is largely cultural, and is used most by students who intend to enter the professions and official service. Later, the Realgymnasium was established in order to give some instruction of a technical nature, at the expense of the classics. Thus we find Latin given for all nine years, but Greek is an elective, given for four or five years. English is taught during all nine years, and French during six years.

An insistent demand for increased instruction in technical subjects in the secondary schools led to the establishment, a short time before the war, of a new school. The former nine year period of secondary training was divided into two parts, six years of instruction in a Realschule, and three years in an Oberrealschule. The instruction in the Realschule is of a general nature. Latin is an elective, and Greek is not offered. In the three years of Oberrealschule technical subjects are emphasized.

Matriculation

Any boy or girl who has completed the work in any of the public secondary schools or who has received instruction in a private school, or at home, must pass an examination, the "matura" (also called the Abitur) before he or she is permitted to matriculate in a German university. This examination is a very severe test, physically as well as mentally. The questions are issued by the state ministry of education. The examination is entirely written, and lasts for eight days. Four or five hours of writing are usually consumed in answering the questions in each subject.

Any boy or girl who passes the "matura" is permitted to matriculate in any department of the university he or she may desire. Those who intend to study medicine usually go to the Gymnasium or Realgymnasium for their secondary school instruction. Any department of any German university must receive all applicants for instruction, providing they have passed the "matura." Since the World War, there has been everywhere in Germany a very great increase in the number of students entering all departments of the universities.

Number of German Medical Students

The following table shows the number of students in the medical schools during the winter semester of 1928-29, or the summer semester of 1929:

Medical School	W. S. '28-'29	S. S. '29
Berlin	2277	
Bonn		1502
Breslau		853
Erlangen		516
Frankfurt		582
Freiburg		1236
Giessen		292
Göttingen		480
Greifswold		494
Halle		263
Hamburg		495
Heidelberg		986

Jena	387
Kiel	748
Köln	435
Königsberg	637
Leipzig	887
Marburg	967
München	2185
Münster	791
Rostock	741
Tübingen	845
Würzburg	1454

The above figures represent the total number of medical and dental students taking the courses in each university. A few more than one-half the total number in each school would be taking the anatomy courses, as the students are divided into two groups, viz., (a) those taking the laboratory courses, and (b) those studying the clinical subjects. Since the pupils enter the elementary schools at the age of six years and complete them at ten, and continue in a secondary school for nine years, most of them are twenty or twenty-one years old when they enter the medical school. The transition from the secondary schools to the university is quite abrupt for these young people. From the close supervision and severe discipline of the former, they go into an atmosphere of almost entire freedom insofar as the manner in which they spend their time is concerned. In most of the courses given in the anatomical institutes, for instance, no attendance is kept either for lectures or laboratory work. A student is permitted to attend lectures or laboratory exercises only after he has paid his fees; having done this, he may attend or not, as he chooses. If a teacher suspects that some students are attending his lectures or laboratory exercises without having paid the fees, he will have some one stationed at the entrance to collect receipt cards, which indicate that the fees have been paid. This sudden change from the compulsory methods and strict discipline in the secondary schools to freedom results in much waste of time and opportunities by many students during the first year or two in the medical school. The presumption is that the students are sufficiently mature to know why they are in the medical school, and the responsibility of learning is placed entirely on them. This process is supposed to weed out those who are not wise enough to take advantage of their opportunities; but, as will be explained later, this result does not follow in the medical schools. The students enjoy their new-found freedom by "loafing on the job." Consequently, just before each Physicum examination, which comes at the end of the second

year, there is much cramming, and the many professional tutors located near the university enjoy a flourishing business.

Division of School Year

The school year in all German medical schools is divided into a summer and a winter semester. The regular schedule of instruction in anatomy is so arranged that the first-year students start work in the winter semester; but a student may enter the institute in the summer semester, which commences about April 15th and ends about August 15th. During this period there is Whitsunday vacation of one week. The long vacation extends from August 15th to October 15th, when the winter semester commences. This semester ends about March 15th and during it there is Christmas vacation of about fourteen days. The lectures are usually started about two weeks after the beginning of the semester. The spring, or short, vacation, extends from March 15th to April 15th. During the long and short vacations the teachers have their time entirely at their own disposal, and most of them spend it in research work; some of the younger teachers, with the consent of the director, give courses during the vacations for students who wish to review. Very few students, however, in proportion to the total number, take these courses.

Curriculum

The entire curriculum is practically the same in all medical schools in Germany, thus facilitating migration of students from one university to others. The arrangement of the curriculum is as follows:

Summer Semester I

Gross Anatomy

Lectures, demonstrations, and study of museum specimens. Muscles, bones, joints, ligaments, skull. No dissecting.

Inorganic Chemistry

Physics

Zoology

Botany

Winter Semester I

Gross Anatomy

Lectures and demonstrations. Dissection of cadavers by students. During this semester the muscles and joints only are dissected and studied.

Organic Chemistry

Physics

Botany
Comparative Anatomy
Histology
Lectures and demonstrations. Study of prepared slides by students.

SUMMER SEMESTER II

Embryology
Topographical Anatomy
Lectures and demonstrations only.
Histology (if not taken in Winter Semester I)
Chemistry
Physiology

WINTER SEMESTER II

Physiology
Topographical Anatomy (if not taken in Summer Semester II)
Gross Anatomy
Lectures and demonstrations.
Dissection.
During this semester the students dissect the contents and walls of the thoracic, abdominal and pelvic cavities, the perineum, the nerves and blood vessels of the entire body, the central nervous system, and the sense organs.

(*To be continued*)

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Endorsement of Aptitude Tests

At the Denver meeting the Association adopted the following resolution:

1. That the Association record its sense of the importance of the study and of the value of the aptitude tests in relation to the selection of students for medical schools.

2. That the Association recommend the use of the aptitude tests as one additional criterion for selecting medical students, suggesting that as long as the work of this committee is continued, the individual colleges make the Association of American Medical Colleges aptitude test a normal requirement except when specifically excused by the admission officers of the college.

3. That next year the tests be given on the same day in all the premedical schools in the United States and a distribution showing the standing of all the applicants, together with the names and scores of the individuals applying to each school be sent to the dean of the medical school concerned.

4. That $1.00 be charged each applicant to cover the expenses of this service of the Committee.

In 1928, more than 600 liberal arts colleges sent students to the medical schools, and in 1929 about 550 sent students. The total number of freshmen for each year was in excess of 6,000, about one-half of these coming from liberal arts colleges other than those connected with the university in which they were seeking admission to the medical school.

Elsewhere in this issue is published the report of the Committee on Aptitude Test as presented at the Denver meeting.

The Committee consists of Drs. Torald Sollmann, chairman, Western Reserve University; H. G. Weiskotten, Syracuse University; Edward A. Koch, University of Buffalo; Beverly Douglas, Vanderbilt University; Fred. A. Moss, secretary, George Washington University.

Journal Back Issues

Many requests for old issues of the JOURNAL have been received, but it was not always possible to respond. There has now come to hand a very limited supply of old issues—thus making it possible to help out those who want to complete volumes for binding.

The following issues of the JOURNAL are now available: October, 1927; January, April, July, October, 1928; January, April, July, 1929; January, March, May, July, September, November, 1930. They will be supplied on request, in order received, as long as the supply lasts.

For Sale

One complete set Index Catalogue Surgeon General's Library, Series I, Vol. 1, to Series III, Vol. 4, inclusive, 41 volumes. Excellent condition. Rare opportunity for medical school or society. Price, $400, delivered. Dr. Walter Freeman, 1801 Eye St., Washington, D. C.

College News

University of Texas Medical Department

Faculty changes: F. L. Butte, who has been on leave of absence in the Cleveland City Hospital for the past year, will return to the department of anatomy as associate professor. J. V. Sessums will also be associate professor in this department. J. A. Place of Columbia University, will be adjunct professor in the department of histology and embryology. In the department of biological chemistry, Meyer Bodansky will become the head of the laboratories of John Sealy Hospital, but will retain a teaching connection with the school of medicine as professor of the newly created department of pathological chemistry. Elective courses for juniors and seniors will be offered as soon as the course is organized.

Marion Fay will be associate professor, Felix Paquin instructor, and Park S. Wharton tutor, in the department of biological chemistry. H. L. Klotz will serve as adjunct professor and Ellen B. Furey as instructor in the department of pathology. Charles H. Taft of New Haven, Conn., will be associate professor in the department of pharmacology. W. L. Marr and V. E. Schulze will serve as instructors in the department of medicine, and A. Lawrence Bennett will be adjunct professor in the department of physiology. Robert M. Moore of Washington University, will serve as associate professor of experimental surgery.

University of Colorado School of Medicine

A department of pediatrics has been organized. Prior to this time pediatrics has been a division of the department of medicine. Dr. Franklin P. Gengenbach was promoted from the rank of associate professor of pediatrics to professor of pediatrics, and head of the department of pediatrics.

Appointments and promotions in the department: Alfred H. Washburn, associate professor of pediatrics; John W. Amesse, assistant professor of pediatrics; Roy P. Forbes, Emanuel Friedman, and Louis C. Wollenweber, instructors in pediatrics.

Other appointments and promotions: John B. Davis, promoted to associate professor of surgery (urology); Henry W. Wilcox, promoted to associate professor of surgery (orthopedics), and head of the division of orthopedics; Charles E. Sevier was appointed associate professor of surgery (orthopedics); Hamilton I. Barnard and Atha Thomas were appointed instructors in surgery (orthopedics). Lyman W. Mason was appointed instructor in obstetrics and gynecology. William C. Black was transferred from the department of clinical pathology to the department of pathology as instructor.

M. Weinberg, of the Pasteur Institute in Paris, visited the School recently, and delivered several lectures on the etiology and pathogenesis of infectious diseases. For many years he has made a special study of gaseous infections of wounds.

Columbia University

Edward S. Harkness has given $500,000 to supplement his original gift of $2,000,000 for a residence hall at the Medical Center.

Faculty appointments: Maxwell Karshan, associate professor of biologic chemistry; John P. Caffey and John D. Lyttle, assistant clinical professors of diseases of children; Beatrice C. Seegal, assistant professor of bacteriology; Leon H. Cornwall, associate professor of neurology.

University of Western Ontario Medical School

Faculty changes: Henry Alan Skinner, associate professor of anatomy; Madge T. Macklin, assistant professor of histology and embryology; Russell A. Waud, associate professor of pharmacology; John H. Fisher, professor of bacteriology; Albert J. Slack, associate professor of public health; Frank R. Clegg and William P. Tew, associate professors of obstetrics and gynecology.

University of Illinois College of Medicine

The Illinois state department of public welfare and the College of Medicine dedicated four buildings, October 29. These buildings, the State Orthopedic Institute, the Institute for Juvenile Research, the Nurses' Home and the Research and Educational Hospital Service Building, are units of the Research and Educational Hospital operated by the University of Illinois. Addresses were given by Governor Emmerson, Harry Woodburn Chase, LL.D., president of the University of Illinois, and Rodney H. Brandon, director of the department of public welfare. After the dedication of these buildings, officials of the University of Illinois laid the cornerstone of their new $1,500,000 Medical and Dental Laboratory Building, at Polk and Lincoln streets. These laboratories are designed to accommodate 200 students in a class. The Research and Educational Hospital has a capacity of 450 beds.

Vanderbilt University School of Medicine

New appointments: Samuel M. Bloomstein, associate professor of clinical pediatrics; Robert Boyd Bogle, associate professor of clinical dental surgery; Walter N. Morgan, and Oren A. Oliver, associate professors of clinical dental surgery; Richard Ashman, assistant professor of physiology; Sam L. Clark, assistant professor of anatomy; Harry T. Hillstrom, assistant professor of surgery in charge of radiology.

University of California

Among the recent gifts received were $10,000 from J. H. Mackenzie for the investigation and treatment of diseases of the nervous system; $5,000, anonymously, for the support of investigations on infantile paralysis in the Hooper Foundation; $2,000 from the estate of John Fryer and from his sons and daughters to establish a John Fryer Chinese Library Fund; $2,500 from Dudley Cates, for research in neurologic surgery, and $1,000 from the National Canners' Association toward the salary of Prof. J. C. Geiger of the Hooper Foundation.

University of Arkansas School of Medicine

The school has entered into an agreement with the city of Little Rock whereby it will take complete charge of the professional care of all charity patients admitted to the Little Rock General Hospital. Under this plan all members of the faculty will become staff members of the hospital and be on a continuous service in the care of charity patients thus insuring adequate teaching facilities in all subjects of the clinical curriculum. The permanent hospital organization will continue as heretofore in charge of pay patients. The school thus has complete control of a good teaching service.

There is a possibility that the professional service of the whole hospital may be given by the school, and, further, city authorities are inclined to discontinue pay service and place the whole hospital on a charity basis.

Washington University

The cornerstone of the Edward Mallincrodt Institute of Radiology was placed, October 2. The building is expected to be completed about January 1

New laboratory building of the School of Medicine of the University of Pennsylvania.

at a cost of $500,000. Within the copper box placed in the cornerstone was a picture of the late Edward Mallinckrodt, Sr., who left a bequest of $300,000 for the erection of the institute.

University of Pennsylvania School of Medicine

On October 10 and 11 an extensive program was presented in celebration of medical progress. Addresses were delivered by Sir Walter M. Fletcher, Professor A. V. Hill, Dr. William H. Welch and others. Honorary degrees were conferred on eight distinguished medical men. Numerous clinical presentations, laboratory exhibits and demonstrations were a part of the purely professional part of the program. Inspection was made of the various new units which

New building of the Meharry Medical College.

enter into the teaching in the medical school was made.

Meharry Medical College

On November 9, the cornerstone of the new building was laid with appropriate ceremonies. Addresses were delivered by faculty, alumni, students. Representatives from many negro organizations were present. A cut of the new building is shown elsewhere. This plant will be ready for occupancy in the fall of 1931.

University of Southern California School of Medicine

Dr. Deuel, professor of biochemistry, has received from the National Research Council a grant of $300 to enable him to carry on his studies on the effect of high protein diet. The American Medical Association has also contributed $300 for the same purpose.

Dr. Clinton H. Thienes, associate professor of pharmacology, has been awarded $500 to aid him in continuing his studies on the relation of the mesenteric nerves to the myenteric flexus and ganglia.

Yale University School of Medicine

The department of public health is conducting health surveys in four communities in Connecticut at the request of these communities and with the approval of the local and state health authorities. Similar surveys in ten cities and towns have been completed.

By the terms of endowment the department of public health is charged with the obligation to promote the general cause of public health in the state of Connecticut. Its expert services are thus placed at the services of any community desiring to take stock of conditions pertaining to the health of its members and to inaugurate such measures as may be needed to improve them. These services are given without charge, but the community must guarantee cooperation and take the steps needed to carry into effect the recommendations made by the department. The community pays the traveling expenses of the staff and the cost of printing the report.

Albany Medical College

A neuropsychiatric problem clinic for minor mental and nervous disorders will be conducted jointly by the college and the Albany Hospital. Sciences relating to effects of mental conditions or body ailments are to have an important part in the work of the department. Dr. Lloyd H. Ziegler, professor of neuropsychiatry in the college will be in charge. He will be assisted by Dr. Hugh T. Carmichael and Dr. Nelson K. Fromm. Dr. Fromm will conduct a neurologic clinic for cases in which the nervous disorder is due primarily to body ailments rather than mental troubles. In general the clinic will provide free service for persons who cannot afford to pay for private treatment by a specialist. The department will provide a new avenue of study for nurses and students, will give practicing physicians in Albany and northeastern New York an opportunity for graduate study in this field, and will expand local facilities for research work. The addition of two research fellows to the department will be provided for as soon as funds are available.

Medical College of Virginia

A gift of $2,500 for purposes of chemico-medical research at the Medical College of Virginia, Richmond, has been announced. At the request of the donor of the money his name has been withheld. This gift will make possible a full-time worker for one year in the department of chemistry. Other departments of the school of medicine will fully cooperate in plans already made for the special line of study to be undertaken and will share in the responsibility for the work as it proceeds.

General News

University of Chicago

The University has planned to undertake an experiment in education, similar to what has been done in many European universities for hundreds of years, namely the induction of scholastic freedom. Fixed, formal education, curricula, hours, lectures, all will be scrapped. Every student will be given opportunity to acquire education unhampered by rules and regulations, except those which require that he must obtain credit for performance, for work done, before the prescribed recognition can be given. In other words, he may graduate as soon as he is ready to do so; perhaps in one year, in two, three, four or more years.

Degrees will be granted only to those who have received special recognition for unusual performance. After having completed prescribed courses in a given field, say arts, no matter how much time has been spent in doing so, whether much or little, the university will select from the student body those students on whom it thinks it worth while to spend more time and money. These students will continue their studies in special courses, with no time limitations, and will receive a degree on the satisfactory completion of the work.

In other words, performance is the sine qua non in this scheme. It is no longer a question of "hours" nor of attendance on lectures or set exercises of any kind. The student is expected to get an education; not mere knowledge which may escape his overloaded memory very soon after he has passed his examinations. The student is "on his own." The good student will make good. The poor student will eliminate himself.

The present nonprofessional graduate school will be replaced by five groups of studies, each with a dean. These are the social sciences, the physical sciences, the biological sciences, the humanities and the college. The plan may, if successful, be extended into the professional schools later.

The experiment is announced as being an effort to answer the question whether the college is worth while and to place the burden of this largely on the individual.

In the biological sciences group are: botany; physical culture; zoology; anatomy; physiology; physiological chemistry; hygiene and bacteriology; pathology, a rather large slice of the present medical school curriculum. Richard E. Scammon is the dean of the group.

The Banting Institute

Ceremonies in connection with the opening of the new $800,000 Banting Institute of the University of Toronto were held recently. Lord Moynihan, president of the Royal College of Surgeons of England, presiding. The cost of the building was contributed by the provincial government, the university and the Banting Research Foundation, which raised funds by popular subscription. It is estimated that when fully equipped the institute will cost over $1,000,000. The building replaces the old pathologic building of the university and will combine its activities with the general hospital. A tunnel under the roadway at College Street connects the hospital and the institute. The sub-basement of the institute contains necropsy and pathologic museum rooms; the first floor is devoted to laboratories in surgical and neurologic pathology and bacteriology, and has a theater seating 250 and a pathologic library. The third floor is for classes.

The architectural beauty is best noted in the large library on the third floor with

its gray stucco ceiling and parquet floor. Over the fireplace in this room is a portrait of Lord Lister presented to the institute by Dr. Edmund St. George Baldwin and the late Dr. F. LeM. Grasett who, years ago, was associated with the discoverer of antiseptic surgery at the Glasgow Royal Infirmary.

Dr. Banting occupies the top and fifth floors of the building, together with seventeen physicians and scientists who collaborate in research. The department has for the first time full-time professors. Other floors contain laboratories for research and pathologic study, and the roof is occupied by pens for experimental animals. The provincial government has a pathologic laboratory in the building where its own staff will analyze specimens pertaining to the public health of the province.

Coincident with the opening of the Banting Institute, a rearrangement of the various departments will be effected. The Institute of Radiotherapy will be enlarged at an investment of nearly $150,000, for the study of the effect of radium, roentgen rays and allied agents. An emanation plant will be incorporated for which work 500 mg. of radium has been set aside, and emanations will be made available for distribution to any reasonable distance. The essential purpose of the institute is to aid research and to enable students to experiment and evolve theories of their own.

Institute for Radiological Research

Announcement has been made of the recent formation of the Radiological Research Institute with Dr. Edwin C. Ernst, St. Louis, as president and Dr. Rollin H. Stevens, Detroit, secretary. This is a philanthropic organization whose object is to direct and coordinate research and to collect and disseminate knowledge in radiology gained as a result of purely scientific experiments or of experience in practical medicine which results have proved to be of the greatest value in medical practice, the arts and in industry. It aims also to render financial aid to research, to aid in the production of radium in this country with an effort to lower its cost, and to place newly developed apparatus where it will render the greatest service to humanity.

The institute will fully cooperate with existing organizations interested in research pertaining to the study, diagnosis and treatment of diseases, especially cancer. In accordance with its provisions for fellowships in radiologic research, three fellowships have been established for research on roentgen apparatus.

Postgraduate Course in Industrial Medicine

The University of Rome has organized a postgraduate school in industrial medicine. The director of the school will be, *ex jure,* the president of the Facoltá medica di Roma. The course will occupy two years and will include instruction in the fundamental matters of industrial medicine and general lectures by the directors of the medical clinics and institutes of the university. The courses will be held in the Policlinico del lavoro, which will permit the use of its facilities, including the persons who appear for consultation and treatment. During the first months of activity, more than 6,300 workmen have visited the Policlinico.

Internship Required for Licensure in Michigan

The Michigan State Board of Registration in Medicine has issued a curriculum of intern work. The board requires that each candidate for a Michigan license must present a certified statement from an approved hospital that he has satisfactorily completed this curriculum of work during twelve months serving as an intern. Each hospital is to provide during the twelve months of residency of each intern six months' service in medicine and six months in surgery. He must

report at a general staff meeting on either a study of any group of hospital cases or a report of research work done in the hospital. The intern is subject to a personal rating as well as a rating on history writing. The chief of staff of the hospital must certify in writing to the board that the intern has conformed to the schedule.

Harvard Fellowships for California Medical Students

The chairman of the Harvard Scholarship Committee of the San Francisco Harvard Club has announced that two scholarships of $500 each, available every year for men of the University of California or Stanford University, are open to students of the medical school. Although these scholarships have been established for more than forty years, all the recipients have attended other departments of Harvard than the medical school.

Graduate Medical Education in Maine

The officials of the Central Maine General Hospital, Lewiston, under the auspices of the Harvard Medical School Courses for Graduates, have announced a plan of graduate medical education for districts removed from large medical centers. The method is to conduct ten teaching clinics either monthly or bimonthly. One thousand dollars has been devoted to put the project into operation and Dr. Soma Weiss, assistant professor of medicine at Harvard Medical School, will head the service.

Philadelphia County Society and Graduate Teaching

Two foundations have been established under the control of the Philadelphia County Medical Society to give impetus to graduate teaching. The Dr. Mary Fisher Foundation, established in 1928, held its first annual ophthalmologic lecture, November 12. The Da Costa Foundation plans its first meeting for the season of 1930-1931. Dr. William W. Keen added $500 to the fund recently.

Fellowships in Extramural Psychiatry

The National Committee for Mental Hygiene has announced fellowships for training in extramural psychiatry open to physicians under 35, graduates of class A medical schools, and those who have had at least one year's training in a hospital for mental disease, maintaining set standards for clinical work and instruction. Applicants able to meet these requirements will not be required to take competitive or oral examinations. Suggestions will be made on the basis of length and type of previous training in the formal psychiatry; all general fitness for the work contemplated, and (in most cases) on the results of a personal interview.

The fellowships cover one year's training with assignments at special places, as the Boston Psychopathic Hospital, the Judge Baker Foundation, Boston, the Institute for Juvenile Research, Chicago, and various child guidance clinics in Cleveland, Philadelphia and other cities.

The fellowships carry stipends of $2,000 to $2,500 for the twelve months' period. Applications should be made to Dr. Frankwood E. Williams, National Committee for Mental Hygiene, 370 Seventh Avenue, New York.

Power Lectures at Johns Hopkins

A series of lectures was given at the Institute of the History of Medicine, Johns Hopkins University School of Medicine, by Sir D'Arcy Power, England, honorary librarian of the Royal College of Surgeons. His subjects were "Essentials of Medical Biography" and "Medical Bibliography," respectively. He spoke on "The Meals of Our Ancestors," "Aris-

totle's Masterpiece," "Medical Iconography," and "The Growth of a Hospital."

Rockefeller Foundation

Alan Gregg has been appointed director for the medical sciences of the Rockefeller Foundation to succeed the late Richard M. Pearce, Jr., in whose work he had for many years closely participated as associate director for the medical sciences. Dr. Gregg will assume his new duties, January 1. Graduating from Harvard University in 1911, and from the Harvard Medical School in 1916, Dr. Gregg, after a year as intern at the Massachusetts General Hospital, served overseas and was made a captain in the medical reserve corps of the British Army. March 1, 1919, he first took up his work with the Rockefeller Foundation as a field staff member of the International Health Board. For three years he was actively engaged in public health work in Brazil. In 1922, he became associate director of the division of medical education. After making studies of medical education in a number of countries which included Colombia, Mexico and Italy, he was stationed at the Paris office of the Rockefeller Foundation, from which since 1925 he has been directing Rockefeller Foundation work in the medical sciences in Europe.

Internships in Orthopedic Hospital

The Hospital for Joint Diseases, New York, has announced six openings in house staff appointments for two years, rotating service in the various branches of practice. At the completion of the two years' service, graduating interns are eligible for the Frauenthal Travel Scholarship of $2,400 a year for six months' study in the leading clinics of Europe and six months' study in the United States, and the Mr. and Mrs. Frederick Brown Research Fellowships, with an income of $4,800, providing an award of $2,400 each to two successful candidates. Application should be made to the director of the Hospital for Joint Diseases, Madison Avenue and One Hundred and Twenty-third Street, New York.

Honor for Dr. Banting

Yesterday afternoon the Council of the Royal College of Surgeons of England conferred the Honorary Fellowship of the College on Dr. Banting, of Toronto. The honor, the highest which the Council can offer, is signal; no other member of the college (Dr. Banting is already M.R.C.S.) has ever before received it. But the discoverer of insulin certainly deserved no less at the hands of British surgeons. His work, as Lord Moynihan pointed out, has a direct bearing on the practice of surgery; it was made possible in the first instance by the achievements of Lister. In its essence it is an application of physiological knowledge to the needs of clinical practice, and therefore represents that synthesis of effort which is the foundation of the science of medicine. Lord Moynihan, who has just returned from Canada referred to the lustre which Dr. Banting's work has shed on medical research in that land. The discovery of an effective treatment of diabetes is certainly the most important contribution to therapeutics which has so far been made by any of the British Dominions. It stands, and will stand, as an inspiration and an example to the hundreds of eager young workers, who, in Canada, in Australia, in New Zealand, in South Africa, and in other parts of the Empire, are dedicating their lives to the prevention and cure of disease.—(*London Times*, Nov. 14, 1930.)

Personals

Thomas S. Cullen, professor of clinical gynecology in the Johns Hopkins University School of Medicine, was presented with the degree of doctor of laws by the University of Toronto at a special convocation on September 16, in connection with the opening of the Banting Research Institute. The honor was conferred in recognition of Dr. Cullen's work on cancer. He graduated from the University of Toronto forty years ago.

Rolland J. Main, formerly of the department of animal biology of the University of Oregon, has become associate in physiology and pharmacology at the Medical College of Virginia.

Hans Zinsser, professor of bacteriology in Harvard Medical School, delivered the Carpenter Lecture before the New York Academy of Medicine October 29. His subject was "Immunity, General and Local."

Willard C. Rappleye, director of study for the Commission on Medical Education for the past five years, has accepted the associate professorship in Medical Economics in Harvard University School of Public Health.

Ernest S. Lewis, emeritus professor of obstetrics and gynecology in the Tulane University School of Medicine, was tendered a luncheon recently by his colleagues to celebrate his ninetieth birthday.

John R. Oliver, of Baltimore, has been elected assistant professor of the history of medicine in the Johns Hopkins University School of Medicine.

Archibald V. Hill, Foulerton research professor of the Royal Society, London, England, lectured on "The State of Water in Tissues" at Northwestern University Medical School, October 20.

John H. Connell, Beloit, Wis., has accepted a position as junior pathologist in the department of medicine of Tulane University.

William H. Welch, professor of the history of medicine, Johns Hopkins University School of Medicine, Baltimore, received the honorary degree of doctor of laws at the sixty-sixth convention of the University of the State of New York, October 16.

Fred J. Wampler, professor of preventive medicine at the Medical College of Virginia, Richmond, has been granted a leave of absence to serve as a member of a commission sponsored by the Institute of Social and Religious Research of New York City to make a study of missions in India.

Walter B. Cannon, professor of physiology in the Harvard Medical School, was recently elected a foreign honorary fellow of the Royal Society of Edinburgh.

Addison Gulick has been appointed head of the department of biological chemistry in School of Medicine of the University of Missouri.

John F. Fulton has been appointed Sterling professor of physiology and head of the department in Yale Medical School.

Karl Landsteiner, bacteriologist and pathologist on the staff of the Rockefeller Institute for Medical Research, New York, has been awarded the Nobel Prize for Medicine. The prize amounts to about

$48,000. The award was based on Dr. Landsteiner's research in connection with blood groups.

Claude S. Beck, assistant professor of surgery in the School of Medicine of Western Reserve University, was given the title of "professor pro tempore of surgery" by Emory University at Atlanta, Georgia, where he was acting as an exchange professor from November 2 to 9, as a substitute for Daniel S. Elkins.

Frederick C. Herrick, of Western Reserve University School of Medicine, has been appointed chief of the surgical division of Charity Hospital, Cleveland, succeeding the late Carl A. Hamann.

Eldon M. Findley, a practitioner in Graham, Mo., has been appointed instructor in physiology in the University of Missouri School of Medicine.

Oliver H. P. Perry, professor of clinical medicine in the School of Medicine of the University of Pennsylvania, will give the sixth annual Scripps Metabolic Clinic Lectures at La Jolla, Calif., early in January, under the auspices of the Scripps Lectureship Endowment, to members of the San Diego County Medical Society.

Otto Folin, professor of biochemistry at Harvard University, is the first recipient of the Scheele Medal awarded by the Chemical Society of Stockholm.

Fred C. Oldenburg, of Western Reserve University School of Medicine, has been appointed chief of the newly created medical division in Charity Hospital, Cleveland.

LeRoy C. Abbott, St. Louis, chief surgeon at the Shriners' Hospital for Crippled Children, has resigned to accept a position as head of the department of orthopedics in Leland Stanford University School of Medicine, San Francisco.

Irving S. Cutter, dean of Northwestern University Medical School, delivered the Stanford E. Chaille Memorial oration at Tulane University School of Medicine.

Harold F. Robertson has been appointed associate professor of medicine at Temple University School of Medicine.

It was reported in the November issue if the JOURNAL that Dr. Ellis had resigned from the Medical School of the University of Missouri to accept a position in the U. S. Bureau of Fisheries. This is a mistake, Dr. Ellis is still professor of physiology in the School of Medicine but is also Director of Research for the U. S. Bureau of Fisheries for the Middle West.

H. T. Hillstrom, of the University of Minnesota, has been appointed head of the department of roentgenology and radiotherapy in Vanderbilt University.

Laurence R. De Buys, professor of pediatrics in Tulane University School of Medicine, was elected president-elect of the American Pediatric Society.

George B. Farnsworth, assistant professor of obstetrics in Western Reserve University, has resigned and will devote his time to travel.

The dean of the faculty of medicine of the University of Birmingham, Dr. Brash, and three members of his faculty will visit the United States as guests of the Rockefeller Foundation to inspect medical schools in furtherance of the building of the new medical school of the University of Birmingham.

Julian S. Huxley, Fullerian professor of physiology in the Royal Institution, London, will deliver two lectures on biology at the New York School for Social Research, January 8 and 15.

Abstracts of Current Literature

Anatomy Acts of California

The law as it now stands is not the best that could be formulated, but only the best it was thought possible to secure at the time (1927). It has a number of very advantageous provisions among which are the following:

1. The extension of the time during which bodies may be claimed by relatives and bona fide friends, from a period of twenty-four hours to thirty days.
2. It requires the keeping of records and their transfer upon request.
3. It puts the custody of the unclaimed dead in the State Board of Health.
4. It makes it mandatory to notify the State Board of Health of the possession of the body of the indigent dead.
5. It forbids autopsies on such bodies without consent of the state board or its representative or representatives.
6. It makes it lawful to obtain fresh human tissue for microscopic investigation at time of a coroner's autopsy.
7. It imposes the expense of burial upon relatives or friends who may claim the dead.
8. It makes noncompliance with its provisions a misdemeanor.

Experience with the administration of the Act of 1927 confirmed the surmises of those especially concerned in the formulation of the bill. Hence an amendment was formulated in 1929, providing that the bodies of all unclaimed dead shall come directly into the custody of educational institutions at the place of death and stipulating that "No other acts or parts of acts shall be construed as limiting the powers of the State Department of Public Health in the transportation or distribution of the indigent dead for educational purposes."

The institutions which need the dead and are entitled to them by law always have paid undertakers considerably more for the delivery of an unembalmed body merely covered with a sheet than generally was allowed for the burial of them by municipalities or counties. Even a pauper's burial necessitates calling for the body, putting it in a black redwood coffin, digging the grave, interring the body and providing a plain board (numbered for identification), and keeping and filing the record, while all that is asked by educational institutions is the delivery of the naked body to them, the recognized claimants under the law.—A. W. MEYER (*Calif. & Western Med.*, Oct. 1930.)

Outline of Proposed Act Governing the Healing Arts

The chief, and almost the exclusive function of an administrative board, is the regulation of the practice of the healing arts. In conception it should be regarded as a police board, created under the police power of the State, exercising its authority for the protection of the public on the one hand, and legally licensed practitioners on the other. Its problems are chiefly administrative. Its most important officer is a qualified, full-time executive, adequately paid, suitably housed, ably assisted, and directed by a representative General Board. The General Board should include in its membership the Attorney-General, the Superintendent of Public Instruction, the Secretary of Health, a distinguished lay educator such as the president of a college, an outstanding citizen experienced in public affairs, licensed practitioners of medicine representative of medical institutions, medical organizations, and special branches of the healing art. A single Administrative Board representative of all interests and groups involved, would

most effectively and economically coordinate all activities having to do with the licensure of any form of practice of the healing art, under uniform requirements of preliminary and technical education, and uniform control thereafter. Such an Administrative Board under broad general powers by the adoption of general rules, altered from time to time to meet changing conditions, should have conferred on it in the act creating it, authority to do the following:

(1) Establish standards of preliminary and professional education for licensure in all branches of the healing art.

(2) Determine the acceptability of institutions, colleges, and hospitals for the education and training of students and graduates, and to establish a registry of such institutions.

(3) Conduct licensing examinations for the purpose of determining: (a) knowledge of the fundamental medical sciences; (b) proficiency in the application of a knowledge of such sciences to individuals and to communities for the preservation of health, and the prevention, alleviation, and cure of disease; (c) authority to appoint with adequate compensation, special examiners to determine the foregoing.

(4) Grant licenses by endorsement of diplomas, and of licenses issued by other states and other bodies.

(5) Investigate, conduct hearings, prosecute and discipline irregular and illegal practitioners.

(6) Suspend or revoke the licenses of those guilty of illegal or unethical practices or conduct.

(7) Require all those licensed to register annually.

(8) Budget annually a sufficient sum to meet the financial expenses of administrative office, investigative, legal, and general expenses.

(9) Appointment of executive officer, clerks, office assistants, and investigators. —R. V. Patterson (*Pennsylvania Med. J.*, Oct. 1930.)

Present Remoteness of Physiologic Research

It is for many reasons a matter of serious concern to Medicine that physiologists have so much neglected hominal research. The primary explanation for this is to be found in that unhappy cleavage between descriptive anatomy and functional anatomy (physiology) which was made a century ago by Sharpey. A knowledge of structural anatomy is important, indeed indispensable to physician and surgeon alike, though none can deny that the teaching of this subject has become too precise and concerned with details too minute for the needs of ordinary medical practice. Nevertheless, when the surgeon requires special knowledge of any particular organ, the most advanced text-book may fail him and he is then compelled to make his own investigations into normal or aberrant details of structure. For physiology, however, the severance was an immediate and immense advantage. The Galenic method with its experimental basis naturally proved attractive to many eager minds. The charm of devising new experiments, the creation of new knowledge, the delight of intellectual adventure, the further problems raised on all sides were a source of endless interest and encouragement to minds seeking novelty, and quick to follow new thoughts to their conclusion. But, little by little and insidiously, investigators wandered away and away from interest in man, and the science of hominal physiology was more and more neglected. Physiology has, indeed, almost ceased to be the old physiology which concerned itself with the normal and abnormal functions of man. The great majority of investigators, many of them among the ablest minds in the profession, have lost by degrees their contact with, or direct interest, in biology, and now the science of physiology is hardly entitled to the name it bears. It is an amalgam of biophysics and biochemistry. Is it not time that physiolo-

gists rediscovered an interest in man? —Lord Moynihan (*Lancet*, Oct. 11, 1930.)

Revision of Medical Education Needed

Changes must be made in the education of medical students. No one can pretend that this training is today entirely satisfactory. I said long ago that the purpose of education was not so much to provide a meal as to create an appetite. In medicine, from preliminary subjects to the final round of clinical work, there is too much forced inculcation of text-book teaching or of rule-of-thumb tradition, and too little training in, or encouragement of, individual powers of observation. The fact that the method of Galen may be illustrated by daily work in wards or theaters passes almost unnoticed. So much learning has to be acquired in so short a time that the mind tends to become a storehouse rather than an observatory, and the student, always conscious of the exacting standards of imminent examinations, is concerned rather with acquisition than with discrimination. With some necessary rearrangement and curtailment of initial subjects of the student's curriculum, with anatomy simplified, shortened, made more relevant to the teaching of clinical subjects (with due recognition of the truth that it is a science concerned not only with what things are but also of what they do) the student would have more time to spend in the wards of such a combined unit of clinical and laboratory workers. He would realize that a capacity for clinical research which combines the methods of Hippocrates and of Galen is the essential quality he must acquire in his student days, and that all his professional life will then offer opportunities for gaining insight into the mysteries of incipient disease, of which today we know so little. Every physician and every surgeon would then be able to build his future career on foundations which could never be shaken.—Lord Moynihan (*Lancet*, Oct. 11, 1930.)

Physiology Lagging Behind

Physiology in its relevance to hominal problems is not, as Sir Thomas Lewis following Sir Clifford Allbutt suggests, outstripping medicine, but is lagging too far behind, concerned too much with the laboratory and with mice, too little with hospital wards and with men. We, the clinicians, have gained gigantic intellectual victories by the acquisition of new knowledge, and of a new vision, with barely recognizable assistance from the laboratory. In all these matters physiology has seemed so aloof, or been so laggard, that our further advances are checked for lack of the particular knowledge which this science alone can now supply. Laboratory workers do not fully realize the immense opportunities of combining animal with hominal research which are in no other way available to them, and which now lie at their hand. Physiologic and other forms of research are drifting further and further away from clinical medicine, to the real disadvantage of both. Any one cannot help but observe a sense of superiority in claims made for the laboratory, and in assertions of the infallible rectitude of its results wherever they clash, or appear to clash, with the sober if in some degree intuitive judgments of the clinician. Yet it is in the application of the methods of both Hippocrates and Galen, in observation, critical judgment, and discrimination followed by hominal and animal experiment, that we shall most surely attain to greater and even greater knowledge of the maladies of men, and so acquire power to conquer or subdue them. One remedy for the present remoteness of physiologists from clinical affairs would lie in an endeavor to develop and sustain their closer interest in human physiology, in the inaugural symptoms of disease, and in those incipient pathologic changes which are correlated

with them. Some constructive ideas of the highest importance long overdue might then issue from the laboratory and find a practical application in clinical work. The foundation of chairs of Human Physiology might well be the means of bringing together the workers in wards and in laboratories; the publication of a journal of Human Physiology would be both helpful and inspiring.—LORD MOYNIHAN (*Lancet*, Oct. 11, 1930.)

Teaching Preventive Medicine

In Vanderbilt Medical School we have endeavored to develop a well organized department of preventive medicine and public health. It has been developed so that about 70 per cent of the work is of a practical nature. We have not deemed it desirable to eliminate entirely instruction by lectures, but this phase of the course has been decreased. The lectures given are on subjects of definite interest and value to the student of medicine as a prospective practitioner. We have developed this course so that it will parallel as far as possible the methods employed in teaching the clinical subjects. Some instruction is given in the second year and also in the third, but the major course is for fourth-year students. Our plan emphasizes field demonstrations. We also hold class conferences once a month for the purpose of having students present their observations on field work. These have proven of much interest and are quite stimulating to both students and instructors. In the combined clinics the clinical clerk sometimes goes out in the field and makes observations relative to environmental conditions at the home of the patient who is to be discussed in the clinic of the Department of Medicine. This information is presented during the regular clinic hour and may be amplified by a representative of the teaching staff of the department of preventive medicine. Thus is developed a cooperative arrangement between the two departments. The fourth-year medical students spend every Monday afternoon for six months in field work. The class is divided into four groups, each of about twelve or thirteen students, and each group is accompanied by an instructor. In this way we bring the student in contact with the practical operations of public health as it is being carried on in the field.—W. S. LEATHERS (*Southern Med. J.*, Oct. 1930.)

The Practitioner Teacher

The practitioner has a definite place in our curriculum, and I pity recent graduates who are deprived of this feature in their medical training. It has been said that perhaps the most important function of the practitioner in the modern medical school is that of a liaison officer between the university professors on the one hand and the general practitioner and the public on the other. It has been hinted that the instructional teaching of the practitioner be narrowed mainly to that of the healing art, and that he be permitted to carry out his task in the amphitheater clinic, if he be of professional rank, or if he be young and of lower rank, in the outpatient department. The practitioner can and does in many instances play the rôle of the middle man, even though the burden oftentimes is obnoxious and unbearable. We should not lose sight of the fact, however, that many of our practitioners are scientists as well as the professional teachers are, and in certain branches of medicine are frequently foremost in their field. Surely these men can be used to great advantage by our medical school organizations not only in rounding out scientific instruction, but also in carrying out creditable scientific bedside teaching while imparting the healing art. The judicious use of these men in clinical teaching is a declaration on behalf of the university in support of the altruistic aims and ideals of the medical profession.—J. W. MOORE (*Southern Med. J.*, Oct. 1930.)

Book Reviews

A Primer for Diabetic Patients

By Russell M. Wilder, M. D. 4th Ed. W. B. Saunders Company, Philadelphia. 1930. Price, $1.50.

This is a brief outline of the treatment of diabetes with a diet containing limited amounts of carbohydrate and protein and insulin, including directions and charts for the use of physicians in planning diet prescriptions. Medical students will find much of value in this multum in parvo and will do well to have it handy for ready reference.

A Textbook of Medicine

By American authors, edited by Russell L. Cecil and (for the Nervous System) Foster Kennedy. 2nd Ed. W. B. Saunders Company, Philadelphia. 1930. Price, $9.00.

Perusal of the list of contributors gives ample assurance of the quality of this exhaustive treatise. About 140 men, each an expert in his subject, have contributed to this book, and as most of them are experienced teachers of medicine in university medical colleges, the material is presented in a form especially acceptable to medical students. It would be presumptious—and, in fact, futile, to attempt to discuss in detail what these men have written. Suffice it to say that nowhere can one find such a complete presentation of the entire field of medicine as here. Every medical student will do well to secure a copy of this work. He will find it a precious asset not only in the study of medicine but in its practice as well.

Legal Medicine and Toxicology

By Ralph H. Webster. W. B. Saunders Company, Philadelphia. 1930. Price, $8.50.

The more usual phases of medicine are presented concisely in order that the student may have such a presentation before him as to enable him to learn the rudiments of the science and likewise prepare himself for examination for licensure. The standing of the author in this field insures a high quality of effort which reaches culmination in a complete exposition of every topic in law as relating to medicine in which the practitioner must have an interest. The book can be recommended highly as an excellent text on this subject.

Minor Surgery and Bandaging

By Gwynne Williams, Surgeon University College Hospital. 20th Ed. F. A. Davis Company, Philadelphia. 1930. Price, $3.50.

What can the reviewer say about a book that has gone into its twentieth edition, the first one having been published in 1861 (but not by the same author). Besides discussing the subjects indicated in the title, emergencies such as strangulated hernia, tracheotomy, laryngotomy, infection of tendon sheaths and other like topics which one would hardly consider as "minor" in nature are discussed. However, it is all well done and cannot fail to be of use to the practitioner as well as the student. The chapters on preoperative and postoperative care of the patient are exceptionally good. Bandaging and splinting are well presented. Numerous carefully made illustrations strengthen the good text. Even the injection treatment of varicose veins is discussed, although the fact that this procedure should not be regarded as being in any sense "minor" cannot be stressed too strongly. The book can be recommended to student and graduate.

Textbook of Histology

By Alexander A. Maximow and William Bloom. W. B. Saunders Company, Philadelphia. 1930. Price, $9.00.

All those who are familiar with the work done by the late Professor Maximow need no reviewer's opinion on the quality of this work—so admirably completed and edited by Professor Bloom. First of all, it is based on human material; second, the functional aspect of strictures is emphasized. Placentation and general embryology are omitted but descriptions of the histogenesis of tissues and organs are included. There is a complete absence of wearying details of histologic technic. The book is profusely illustrated with nearly seven hundred beautiful reproductions of cells and tissues. Many of the drawings are the senior author's handiwork. All the illustrations really illustrate and will prove of great help and value to the student. The general arrangement is most satisfactory. The mechanical work is excellent.

Diseases of the Skin

By George Clinton Andrews, Associate Professor of Dermatology in Columbia University College of Physicians and Surgeons. W. B. Saunders Company, Philadelphia. 1930. Price, $12.00.

Now, that instruction in dermatology in the undergraduate medical school has necessarily been curtailed considerably, the graduate will find need to inform himself further either by graduate study if he intends to specialize, or by providing himself with a good textbook from which he can learn what he must know. Besides discussing fully and well the diseases of the skin, the author also presents four chapters on radiation and light therapy; and a chapter on surgical diathermy. The chapter divisions are logical; and the bibliography at the end of each chapter will be greatly appreciated. It is very complete—in some instances rather extensive. The 998 illustrations are nearly all original photographs and drawings. They are very well reproduced. Credit should be given to the publishers for their share in producing such a commendable book.

Handbook of Therapeutics

David Campbell, lecturer in materia medica and pharmacology in the University of Glasgow. William Wood and Company, New York. 1930. Price, $4.50.

The importance of a more thorough training in the treatment of disease is again receiving recognition. More "hours" for therapeutics are being assigned in the curriculum. It is true that every teacher should have something to say about the treatment of the sick, but all too often the allotted time is consumed by discussions of pathogenesis and symptomatology. Here is a handy little volume devoted wholly to treatment. It is written in an interesting style and the arrangement of subjects is admirable. While in the main, chaptered according to the various systems of the body, with specific subheads for the diseases of these systems, diet, water, biological products and physical methods of treatment are by no means neglected. Several hundred illustrations and tables add greatly to the value of the book.

Handbook of Anatomy

By James K. Young, revised by George W. Miller, associate in anatomy in Jefferson Medical College. 7th Ed. F. A. Davis Company, Philadelphia. 1930. Price, $3.75.

Convenient in size, well arranged, splendidly illustrated, replete with useful tables, the medical student will find this book a distinct aid not only in studying anatomy, but in reviewing the subject during the clinical years.

Textbook of Physiology

By William H. Howell, Professor of Physiology in the School of Hygiene and Public Health in Johns Hopkins University. 11th Ed. W. B. Saunders Company, Philadelphia. 1930. Price, $6.50.

This book is so well known and widely used that its many excellent qualities need not be set forth in a review. For the past twenty-five years it has been the standard text in many medical schools. The present edition has been thoroughly revised and added to to bring it up to date and to merit a continuance of the good will shown toward it by teachers of physiology. It is still a good textbook.

Synopsis of Medicine

By Henry L. Tidy, Physician to St. Thomas Hospital, London. 5th Ed. William Wood and Company, New York. 1930. Price, $6.00.

Despite careful revision of the text, the additions called for by the inclusion of descriptions of typical forms of well known diseases, and new diseases, this book has grown in size until it now numbers more than one thousand pages. Some chapters have been entirely rewritten, such as those dealing with lethargic encephalitis, vitamins, ulcerative colitis, pneumococcal peritonitis, and others. This book should make a strong appeal to the medical student because of the arrangement. Side heads and subheads make it possible to find any desired information speedily. And the concise manner in which everything is stated makes reading easy. There is no waste of time or space and yet—as under "treatment" one finds in each instance a complete and eminently satisfactory exposition of that most essential side of medical practice. It is all there. There is an entire absence of illustrations, charts and tables—all of which can be found in larger texts. This is really a glorified quiz compend or pocket manual.

Textbook of Histology

J. Lewis Bremer, M. D. 4th Ed. [illegible] Lewis and Stöhr, P. Blakiston's Sons and Company, Inc., Philadelphia. 1930. Price $6.00.

The unique advantages of this standard text may well be recalled, viz (1) its embryological approach to the subject matter; (2) its short historical notes which furnish a valuable and interesting background; (3) brief accounts of the function of the organ whose structure is being studied, with emphasis on the functional activities of its cells; (4) references to special articles for further reading in American Journals and books as being the most convenient and with the microscopical technique while the sections on general and special histology have been somewhat enlarged. In short this is an up-to-date edition, a valuable and useful text. (N. M. Grier).

Guide to Study of Histology and Microscopic Anatomy

By Avery E. Lambert, Ph. D. P. Blakiston's Sons & Co., Inc., Philadelphia. 1930. Price, $3.00.

This laboratory manual attempts to meet the situation resulting from the movement to reduce the hours which may be devoted to the presentation of the non-clinical courses, especially those which occur the first year of the medical curriculum. It is, on the other hand, outstanding in its thoroughness among works of its type keeping in mind the practical needs of the student from the time he enters the laboratory until he completes the course and very frequently saving him the necessity of referring to the text books on subject matter. Clearly written and well illustrated, it may well function on the laboratory side of instruction with most of the better known texts. (N. M. Grier).